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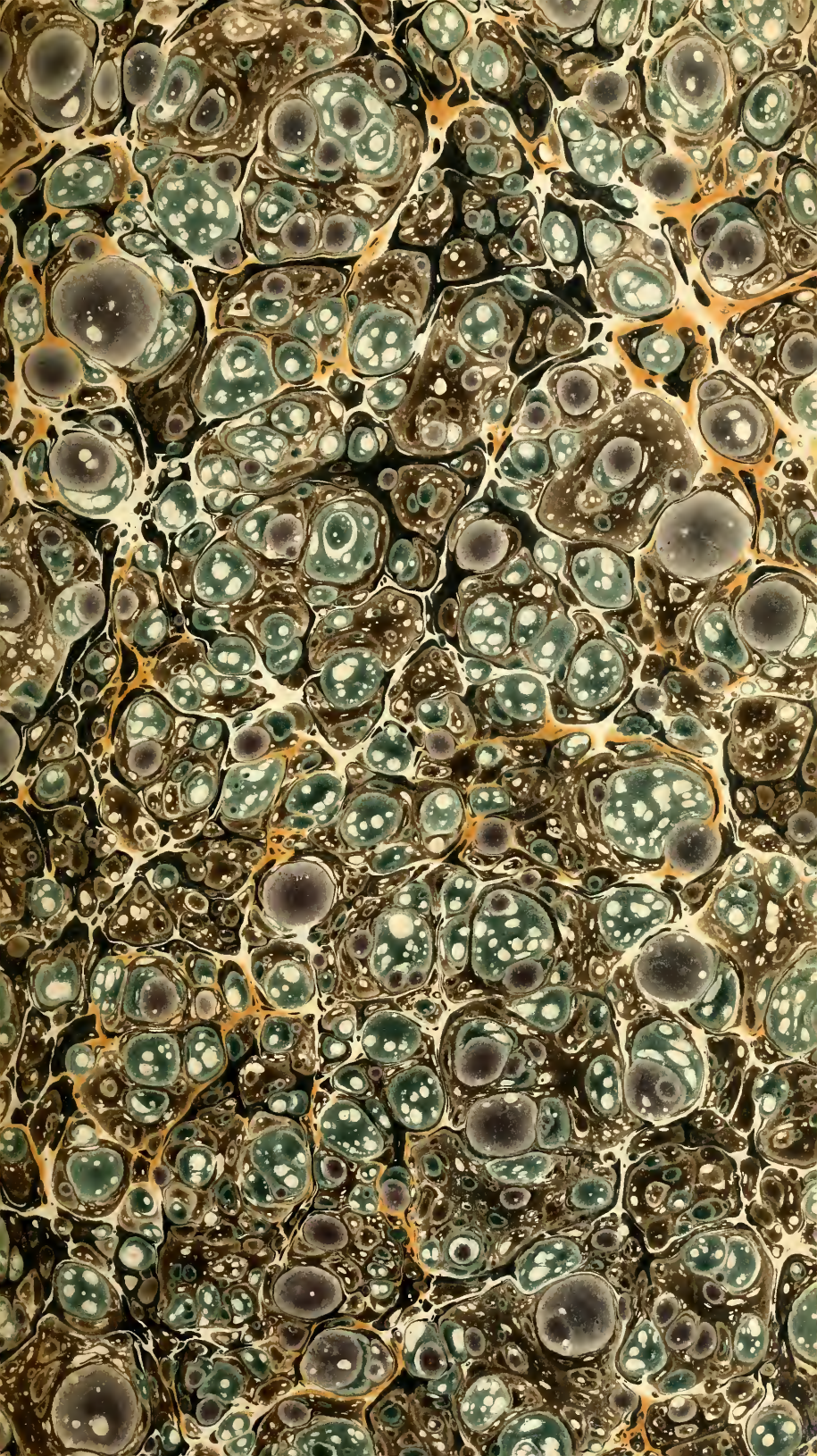

Charles B. Fiske

19th CONGRESS, 1st SESSION. | Doc. No. 158. | HO. OF REPS. WAR DEPT.

JUNIATTA, AND CHESAPEAKE AND OHIO CANAL.

LETTER

FROM THE

SECRETARY OF WAR,

TRANSMITTING

A REPORT OF THE ENGINEER,

EMPLOYED IN EXPLORING THE COUNTRY BETWEEN BEDFORD AND CUMBERLAND

WITH A VIEW OF UNITING THE

Juniatta,

BY THE ROUTE OF THE JUNIATTA AND WILLS CREEK, WITH THE

Chesapeake and Ohio Canal.

APRIL 12, 1826.

Read, and laid upon the table.

APRIL 15, 1826.

Referred to the Committee on Roads and Canals.

WASHINGTON:
PRINTED BY GALES & SEATON
1826.

WAR DEPARTMENT,

April 11, 1826.

SIR: In compliance with the resolution of the House of Representatives, of the 10th instant, instructing the Secretary of War to communicate to the House the report of the Engineer recently employed in exploring the country between Bedford and Cumberland, with a view to ascertain the practicability of uniting the Juniatta with the Chesapeake and Ohio Canal, by the route of the Juniatta and Wills Creek, I have the honor to transmit, herewith, the report of the Chief Engineer, of this date, furnishing the report called for by the resolution.

With great respect,

I am, sir,

Your most obedient servant,

JAMES BARBOUR.

To the Honorable,

The SPEAKER of the

House of Representatives.

ENGINEER DEPARTMENT,
April 11, 1826.

SIR: In obedience to your instructions I have the honor to lay before you the report of the Engineer recently employed in exploring the country between Bedford and Cumberland, with a view of ascertaining the practicability of uniting the Juniatta with the Chesapeake and Ohio Canal, by the route of the Juniatta and Wills Creek, together with a map accompanying it.

It would be desirable to have the abovementioned original report and map restored to the files of the Engineer Department, whenever copies can be prepared to be substituted for them on the files of the House of Representatives.

With great respect,
I am, sir,
Your most obedient servant,
ALEXR. MACOMB,
Maj. Gen. Chief Engineer

The Hon. JAMES BARBOUR,
Secretary of War.

UNION, (PA.)
March 30th, 1826.

To the Board of Internal Improvement:

GENTLEMEN: I have the honor to transmit, herewith, a report of an examination recently made, in pursuance of your letter of instructions of the 21st ultimo, accompanied by a map embracing the section of country which has been subject to the investigation.

I have the honor to be,
With great respect,
Your ob't and very humble serv't,
JAMES SHRIVER,
U. S. Assistant Civil Engineer.

BOARD OF INTERNAL IMPROVEMENT.

REPORT.

In pursuance of the instructions of the Board of Internal Improvement, received at Washington the 22d ultimo, directing that I should "repair to Bedford, (Bedford County, Pa.) with a view to examine the several valleys emptying, in that quarter, into the Raystown branch of Juniatta, and which might be used to connect, by a canal, the latter stream with the valley of the Potomac, &c." I left the city with as little delay as possible, and as soon as the spell of rains, which immediately succeeded the time of receiving the instructions, subsided, I entered upon the investigation with which I had been entrusted.

In the performance of the duty assigned me, my attention was first, and chiefly, directed to those objects to which it seemed particularly called by the instructions, and afterwards to such matters as were not specifically directed, but seemed, notwithstanding, connected more or less intimately with the object which had given rise to the investigation.

From information derived, through inquiries previously to entering upon the examinations, from persons having a pretty accurate general knowledge of the country between the Potomac and Juniatta rivers, I was satisfied that no ground could be found near the contemplated line of cross communication, where equal facilities for a canal connection were presented, as through either Cumberland or Wills Creek valley. West of these, no feasible ground occurs, and on the East, although a series of lateral ridges continue, having their intermediate *coves* or valleys running in a favorable direction between the Potomac and Juniatta, it was understood no suitable ground for a canal was presented. These considerations, together with the knowledge that a connection East of Evitts and Wills Creeks would not effect in as desirable a manner, the object intended, were sufficiently inductive to determine in favor of the examination being confined exclusively to the valleys of the streams to which I have just adverted.

By an inspection of the sketch herewith transmitted, compiled from the State Map of Pennsylvania, and corrected from observations made during the explorations, it will be perceived that either of these valleys possesses, in a remarkable degree, directness of course between the places to be connected—that the streams flowing through them to the Potomac and Juniatta, have their sources within short distances of each other; and that no obstacle, whatever, seems to be presented to their ready connection. In the first and second respects, the facts are certainly as indicated by, and inferrible from, the map, presuming it to be, as I believe it is, essentially correct. In the latter, although it does not appear from the accompanying map, nor would it indeed be indicated by the most accurate topographical delineation, that any

serious obstacle intervenes, yet, there is no doubt that, upon a careful application of instruments, the obstacles presented on either route in question, will be such as to require a tunnel of some extent to form the connection.

To effect a connection through Cumberland Valley, between Evitts creek and Shover's run, the shape of the intervening ground proves that a long, perhaps an unfeasible tunnel would be requisite. Between Little Wills creek, and Buffalo run, (the streams of Wills creek Valley.) a more favorable appearance exists: the separating ground is less formidable, and the streams at points not so far distant from each other, are considerably larger. The decided advantages which the route through Wills creek Valley apppeared to possess over the other, led to the abandonment of any thing further than a hasty investigation of the Cumberland Valley, and at the same time to something more than a mere superficial examination of that of Wills Creek, upon which some experiments were made with an instrument. A line of hasty levels was, for instance, executed, for about five miles, embracing the dividing ridge, in order that a more accurate idea might be formed of the probable extent of the cutting or tunnel, which might be required. The fall of a portion of Buffalo run and Wills Creek was also determined by the level, with a view to procure a kind of *standard*, by which the fall in these streams, and in others which were intended to to be examined, might be more accurately estimated or computed.

The instructions of the Board, it is known, did not contemplate any actual surveys, and they have even expressly signified, that the operations were in the first instance to be limited to a full superficial examination merely; hence it is not to be understood, when alluding to surveys, that any thing, further than very hasty experiments with a portable instrument, (with which, indeed, it would have been impracticable to procure nice results,) were made. These, hasty as they were, will, however, put it in my power to present to the Board such information relative to one of the chief circumstances upon which the practicability of the scheme will depend, as will in a great degree be entitled to reliance being placed upon it, and enable them to form an opinion on the subject, with less apprehension of error.

On the map will be found a projection of the profiles alluded to, of the dividing ridge between Little Wills Creek and Buffalo Run. The levels were taken, as have been intimated, over a distance of about five miles, viz: 2½ on each side of the summit, which was ascertained to be about 140 feet in elevation above the assumed base of the line of levels. The slope on each side of the ridge is very regular, descending at about equal angles of declination. On the Wills Creek slope the declivity is perhaps greatest. The points between which the levels were executed, were fixed upon after a superficial investigation had been made, with the supposition, that they were suitably situated for the extremes of the necessary summit level.

The subsequent experiment, however, discovered that they were established too remote from each other for that purpose, supposing faci-

lity to be a desirable object in the accomplishment of the connection. Going upon the supposition that the cuttings in approaching the ridge ought not exceed a depth of 35 feet, and assuming the acclivous and declivous surfaces of the ridge to be regular planes, from which in fact they do not materially deviate, the length of the tunnel required would be 3¾ miles, and under a ridge at the highest point of 140 feet. This length of tunnel may, however, be avoided; and inasmuch as but very little additional water is received in either stream on the two last miles of the proposed five mile summit, it would be effecting the connection with much greater facility, and with the disadvantage only of a greater elevation of the summit, by fixing its extremes but about 2½ or 3 miles apart, which would then require a tunnel of about 1¾ miles. The points assumed are marked A and B on the map, and the direction of the summit level shewn by a line of blue.

When reference is had to the construction merely of a summit level upon this principle, the circumstances connected with its accomplishment are of the most favorable nature. It would be a work of perfectly easy execution, both as respects the shape of the ridge and nature of the soil through which the excavations and tunnel would require to be conducted. But it is a subject to be decided upon a different kind of investigation, and is to myself, at present, a matter of some doubt whether, in dry seasons, a sufficient supply of water may be commanded. At the time the examinations were made, the streams were found generally discharging their medium quantities, perhaps rather more; a long spell of rain had preceded that period, the streams had been much swollen, and hence gave favorable results.

Little Wills Creek and Buffalo Run were gauged* at the points A and B, the extremes of the shorter proposed summit level, and were found to discharge, the former six, and the latter nine cubic feet per second, equal together fifteen cubic feet. This supply, it is presumed, would be adequate to the demand of the summit, if it could be relied on as constant; but it is known that a calculation of this kind would be greatly erroneous. These streams were represented by some persons (who, residing in their vicinity, must necessarily have noticed their changes,) as discharging, at the period of the examination, about double the quantity they give in the dryest season: this would give, supposing their estimate correct, but 7½ cubic feet as their collective minimum expense, and even this, it is believed, would, after a fair investigation, be found to exceed the truth.

It was certainly not to be presumed that the connection in question could be produced between Little Wills Creek and Buffalo Run, upon the plan proposed, relying upon those streams *alone* for the supply of the summit level, and the canal thence southwardly and northwardly to their respective mouths. An acquaintance with the character of mountain streams, necessarily obtained during former investigations, satisfied me that *these* would not afford a sufficient supply, and hence considerable pains were taken in order to ascertain whether, and if

* According to the formula $(v - \sqrt{v} + .5) \times$ section $=$ discharge.

so, how auxiliary supplies might be brought into requisition. The Raystown branch of Juniatta, and Shawnee Cabin Creek, were examined with this view, and some attention was also given to Dunning's Creek for the same purpose.

From B to the mouth of Buffalo Run, (four miles,) the fall is computed at 90 feet. Comparing that part of the Juniatta, (above its junction with Shawnee Cabin Creek) with this stream, its fall seems so nearly the same, that in about five miles, it is estimated the same quantity (viz. 90 feet,) will be found to exist. At C for instance, something upwards of six miles above the mouth of Buffalo Run, the Juniatta is supposed to be sufficiently elevated to flow in a feeder to the summit level. A feeder may be conveniently located around the base of Dry ridge, as represented with a red line, and would be found to embrace a soil of easy excavation, and of favorable character for such a work. Its probable length would be from eight to twelve miles. Shawnee Cabin Creek, though not usually as large a stream as the Juniatta, is understood to be more durable, and to discharge the most water in *dry* seasons. At a point, about opposite the proposed commencement of the feeder on the Juniatta, it is believed to be more elevated than that stream, and if so, its waters can of course be conducted to the summit. Supposing the formation of a reservoir above the point on the Juniatta, where the feeder would commence; then the best plan of commanding the Shawnee Cabin Creek, would probably be, to conduct it into the same receptacle, whence the *same* feeder would answer. This may be done either by constructing a feeder round the base of the hill separating these streams, or along the course of a small intermediate branch, and through the separating hill, at a favorable gap or depression, in which this *intermediate branch* has its source. The probable track of this feeder is marked by a yellow line. As to Dunning's Creek, which has the character of being a very constant stream, it is doubtful whether any of its waters can be made available. Possibly a depression sufficiently low to admit the passage, in that direction, of some of its *head* waters, may be found at the source of Adams' Creek.

The construction of feeders from the former streams, is considered comparatively easy. It has already been remarked that the soil is considered favorable. Indeed, no obstacles worthy of notice are presented. On the contrary, the most promising appearances of an easy accomplishment of works of this kind are presented.

The Board will understand it to be my belief, that the Juniatta and Shawnee Cabin Creek, may be commanded, and brought to a summit level, practicable between Little Wills Creek and Buffalo Run. Still, however, it is a matter of uncertainty, even in the event of this opinion being correct, and a doubt which can only be resolved upon further and more minute investigation, whether even the supply from these streams, promising, as it appeared to be, would prove adequate at all times.

Judging from their ample discharge, at the time of the examination, and considering, also, the extent of territory which is drained by

them, the opinion is strongly induced that they must, at all seasons, be sufficient. Indeed, the belief of most persons familiar with those streams, is conclusively to that effect; but it is so well known how frequently errors are committed on this subject, that the opinions of any person, unless founded upon something better than mere casual observation, are entitled to but little credit. The Juniatta was gauged at several places near where it was supposed it could be commanded. The mean of three experiments gave for its discharge 48 cubic feet. per second. The Shawnee Cabin Creek was also gauged near Shell's mill, and gave about 35 feet. They were both estimated to be discharging above their medium quantities.

There is a possibility, then, that the natural discharge of the Juniatta and Shawnee Cabin Creek, may prove sufficient; but, if not, resort may be had to reservoirs, which may be formed in their valleys. As far, however, as they were examined, (about seven miles above their junction,) no favorable site for a receptacle occurs. Both streams, thus far, have their courses through flat open bottoms, generally of considerable width, and where, by flooding the waters, a great surface would unavoidably be exposed to the evaporating effects of the sun and winds. In ascending higher than the points alluded to, it is understood the width of the bottom lands diminishes, and that favorable situations for reservoirs occur. In forming them nearer the sources of the streams, it would only be attended with the disadvantage of longer feeders, inasmuch as the streams are known to be more constant near their sources, than they are lower down. The fact, in this instance, is established, by the circumstance that a mill, situated on Juniatta, perhaps twelve miles above the forks, continues in operation (so it was asserted) throughout the year, when, at its junction with the Shawnee Cabin Creek, it does not afford what would suffice for a similar establishment. These remarks, it is proper to observe, apply more particularly to the Juniatta than to Shawnee Cabin Creek, upon which a tolerable site for a reservoir occurs just above Mr. Shell's mill, and where, too, it may be observed, the stream is remarkable for its durability. The mill just adverted to, is represented, by its owner, as having a supply of water sufficient to keep it in constant operation, and that this supply is derived principally from a large spring, a short distance above, the waters of which alone propel a mill during most seasons of the year.

Supposing, in an eventual projection of the canal, that it will become necessary to resort to reservoirs as a means of constant supply, it will probably be found that the ravine of the upper branch of Buffalo Run and those of Hugh's camp and Lyberger's Runs (the upper branches of Little Wills Creek,) may be conveniently used for that purpose. Than on the former stream, perhaps a more favorable site, possessing greater natural advantages, could not be found; it flows through a deep, narrow ravine or cove, formed on the western slope of Wills Mountain by a parallel rib, or inferior mountain, known and designated on the map as Buffalo ridge; through this ridge the stream seems to have torn its way, and to have worn itself a deep, nar-

row passage. At this gap a dam may be cheaply constructed, and a work of this kind, of comparatively small extent, would create a reservoir of very considerable capacity, all the waters of which, from its situation in relation to the summit, could be made available. On Hugh's Camp and Lyberger's Runs, the localities are less favorable, but no doubt capacious reservoirs may also be formed in their valleys. There exists, however, an objection to calculating with too much confidence upon these means, arising from the doubt whether reservoirs of great capacity would, in any season, be amply replenished by streams draining so limited an extent of territory.

As regards the construction of the canal, Wills Creek Valley may be considered, and especially when reference is had to the mountainous character of the country embracing it, as unusually favorable: that portion through which Buffalo Run flows, (the term Wills Creek Valley being also properly applicable to it,) is singularly so. The bottoms along the stream have a superstratum of loam, based upon a tough clay, and being free from stone or gravel, will not only admit of an easy excavation, but will also form a perfectly impervious canal. From the mouth of Buffalo down the Juniatta to Bedford, the same remarks are applicable, and with even greater force. Building materials can also be easily had for such works as might be necessary on this part of the canal, and in fine, no obstacles will be presented that may not very easily be overcome. On the other portion (along Little Wills Creek) the valley is less favorable. The stream, with a probable average fall from the end of the summit level to its mouth of about 35 feet per mile, flows generally close along the western base of Wills Mountain, and having also a range of hills on the other side, with their bases terminating at many places near its course, the valley, at no place very wide, is thus at frequent intervals reduced to limits so narrow, as to admit of but little more space than would be requisite for the canal, and a passage for superflux waters. The soil is also less favorable, being generally of a sandy character, and full of loose stones. Sections of a rocky character also occur. The stream, however, seems promising as to supplying water, is represented to be durable, and as furnishing at most seasons a valuable quantity;* notwithstanding, therefore, the unfavorable circumstances to which I have alluded, the execution of a good canal on this section would be a work of no great difficulty.

The distance from the mouth of Buffalo Run, southwardly to the mouth of Little Wills Creek, is about fifteen miles, and will have a probable rise and fall of three hundred and fifty feet. From the mouth of Little Wills Creek to Cumberland, it would be super-

*An inspection of the map will shew that the district of country tending towards Little Wills Creek, is very considerable, and that hence a large supply of water flowing through its channel is to be expected during wet seasons. Some idea may be formed of its freshets, as well as of the character of its channel, from the fact that there are annually a great many boats built at the mouth of Lyberger's Run, which, at high water, are easily floated from thence along Wills Creeks to Cumberland. These boats, used for the coal trade, are of the flat kind, usually 70 feet long, and from 15 to 20 feet wide.

fluous to say any thing, inasmuch as an actual survey and report has, or shortly will be made in relation thereto. To Bedford from the mouth of Buffalo Run, the distance is computed at about eight miles; the Juniatta will probably have in that distance, a fall of one hundred feet.

Doubts have already been plainly signified as to the practicability of a Canal through Cumberland Valley, and the Board will have understood that these doubts originated principally from the evident considerable rise between Evitt's Creek and Shover's Run. In addition to this circumstance it may be mentioned that these streams rise exactly opposite each other, and do not, as is the case with Little Wills Creek, and Buffalo Run, interlock, or flow past each other; that hence, they have less water at similar distances from the summit of the ridge dividing them,* and that the scope of country which they drain is much inferior, and of course their supply will be less constant. Further, it is believed it will be much more difficult to command a supply for this route from any of the neighbouring streams, nor are there as favorable sites presented for reservoirs, on the streams of this Valley, as on those of that already considered.

RECAPITULATORY STATEMENT,

Of computed distances, rise and fall, &c.

		Miles.		Feet.
From Bedford to mouth of Buffalo Run,	Probable distance,	8.	Probable rise	100
From the mouth of Buffaloe Run to the Northern end of the summit level,		4½	do	90
Length of summit level,	- - -	2½		
From the the Southern end of the summit level to the mouth of Little Wills Creek,	Probable distance,	8	Probable fall,	260
	Total,	23	Total,	450

FEEDERS.

Feeder from the Rays town branch of Juniatta to the summit level,	Probable length,	10 miles.
Feeder from Shawnee Cabin creek, to ditto,		15
Feeder from Dunning's creek to ditto (doubtful as to its practicability,		25

* Shover's Run, at the Bedford Springs, was found to discharge an equal quantity with Buffalo Run, at the end of the summit level. The first one and a half, the other four and a half miles from its mouth.

SUMMIT LEVEL.

TUNNEL.—Probable length,	1 mile	1,175 yards.
DEEP CUTTINGS.—Probable length,	0	1,200

Having thus presented, somewhat in detail, such facts and opinions to the Board, in relation to the contemplated Canal connection, as will probably enable them to decide whether or not the results of the investigation are sufficiently promising to justify the execution of actual surveys; and having also attempted to present the subject in such a light as to furnish them grounds for the formation of their own opinions, it is not deemed improper to add, as the opinion of myself, (fully justified, it is conceived, from what has been seen of the country, together with a knowledge of the importance of the contemplated object,) that the subject is deserving of further and more particular investigation. Neither is it considered an improper assumption, to offer it as my belief, that no examination can be profitably made at the present, or until late in the summer season. The propriety will naturally occur to the Board, of procuring, previously to any actual surveys, for other purposes, a minute knowledge of the Hydrographical character of the country, *such as it is in dry seasons;* upon which, in a great measure, will depend the ultimate adoption or rejection of the contemplated project. This can be accomplished only during the autumnal months, when, it is known, the expense of our streams is generally a minimum.

All of which is respectfully submitted.

JAMES SHRIVER,

United States Assistant Civil Engineer.

19th CONGRESS. 1st SESSION. [Doc. No. 151.] Ho. of Reps.

CHESAPEAKE AND OHIO CANAL.

MEMORIAL

OF THE

CENTRAL COMMITTEE

OF THE

Chesapeake and Ohio Canal Convention,

AND OF THE

COMMISSIONERS APPOINTED BY THE STATES OF VIRGINIA AND MARYLAND, AND BY THE UNITED STATES,

TO

Open books for Subscription of stock to the said Canal.

April 3, 1826.

Referred to the Committee on Roads and Canals.

WASHINGTON:

PRINTED BY GALES & SEATON

1826.

MEMORIAL.

To the Senate and House of Representatives of the United States, in Congress assembled, the Memorial of the Central Committee of the Chesapeake and Ohio Canal Convention, and of the Commissioners appointed by the States of Virginia and Maryland, and by the United States, to open books for the subscription of Stock to the said Chesapeake and Ohio Canal, respectfully represents:

That numerous assemblies of citizens of the States of Ohio, Pennsylvania, Maryland, and Virginia, and of the District of Columbia, deeply interested in the improvement of the navigation of the waters of the Ohio and Potomac rivers, and their connexion by a continued Canal, deputed Delegates to a Convention in the City of Washington, empowered to digest and to promote the adoption of the best means of accomplishing the above object.

This Convention met in the Capitol of the United States, on the 6th day of November, 1823, and agreed upon the resolutions contained in the annexed Journal of their Proceedings. Pursuant to one of those resolutions a supervising Central Committee was appointed to correspond with, and to harmonize the views of the dispersed friends of the common enterprise, and to recommend to the Legislatures of the States of Ohio, Pennsylvania, Maryland, and Virginia, and of the United States, the exclusive sovereign of the District of Columbia, a combined system, conformable to the views of the Convention.

After much ineffectual legislation, and consequent delay, the States of Virginia and Maryland, at length concurred in chartering a Joint Stock Company, with authority to extend a Canal from the tide of the Potomac, to the navigable waters of the Ohio, under certain conditions set forth in their acts of incorporation. Among those conditions, it is provided, that the proposed Canal shall consist of two sections; one denominated the Eastern, to commence within the District of Columbia, and passing up the valley of the Potomac, to terminate amidst the coal banks, at the base of the Alleghany; the other, or Western section, after crossing that mountain, to reach a point on the Western waters, already accessible by the steam boats of the Ohio.

That the Eastern section shall be first executed, and the authority to begin and finish it be deemed complete, on receiving the sanction of the Congress of the United States, and the assent of the existing Potomac Company, in whom the States of Maryland and Virginia had,

by acts anterior to the ratification of the Federal Constitution, vested all their rights to improve the river Potomac, and its tributary streams, for the purposes of navigation. That the authority to complete the Western section should await the concurrent assent of the Legislature of Pennsylvania, and the subscription of funds adequate to the accomplishment of the entire work.

The sanction required of the United States, was conferred by an act of the last Congress, approved by the President, on the 3d day of March, 1825.

The Potomac Company complied with the terms of the new charter, by their resolutions of the 16th day of May, 1825; a copy of which, with the preceding acts, is annexed to this Memorial, together with such Abstracts from the charter of the Old Company, and the proceedings thereof, as manifest the extent and value of the rights which they have conditionally surrendered.

By these several acts and resolutions, a complete authority is provided, for any company, which they may create, to begin and complete the Eastern section of the Chesapeake and Ohio Canal.

On the 7th day of February, 1826, the Legislature of Pennsylvania, by an act, of which, a copy is hereto subjoined, gave their conditional assent to the common charter.

An inadvertent mistake, believed to be within the reach of judicial correction, having its origin, it is supposed, in a hasty transcription or engrossment of the original act of Virginia, the basis of the new charter, the Legislature of that State have deemed it expedient to correct, by an explanatory act hereto subjoined.

In the execution of these several acts, the President, during the past summer, appointed three Commissioners, in behalf of the United States; and at subsequent periods, the Executives of Maryland and Virginia severally deputed, each, three Commissioners, on behalf of their respective States, to co-operate jointly in obtaining subscriptions of stock to the Canal, so authorized to be constructed.

The late President of the United States, in his Message at the opening of the first Session of the Eighteenth Congress, adverting to the recent Convention in Washington, earnestly recommended the object of your memorialists, and in order to place beyond doubt its practicability, advised that a survey should be made of the "*unexplored ground*," over which the proposed Canal was to be conducted. The Commissioners, apprised by the report of this survey, from the United States' Board of Internal Improvement to the last Congress, that a further report would be made to the present, have delayed the performance of the duty charged upon them, until the estimates expected to accompany that report should be completed.

In the interim of this unavoidable, though regretted delay, by a legislative act of the 8th of March, 1826, the 19th, 20th, 21st sections of which, are hereto annexed, the State of Maryland has authorized, upon certain conditions, subscriptions of half a million of dollars to the stock, which may be required for the completion of the Eastern section of the contemplated Canal.

To these conditions, and especially to those of them which render the validity of the subscription of Maryland dependent on the co-operation of the Government of the United States, in subscribing to the same stock, your memorialists beg leave to solicit your attention. They confidently believe that upon that co-operation, the success of their whole enterprise must ultimately rest.

In asking as early an attention as may be consistent with the public interest, to this object of their Memorial, your memorialists do not desire to anticipate the expected estimates of the United States' Board of Engineers, by a pledge of any part of the public revenue, to the accomplishment of a work, which should not, they are aware, be undertaken without due consideration, nor begun, without adequate resources. They seek to obviate, as far as is within their power, the consequences of a yet farther delay of those estimates, by placing before you their Memorial, with the acts of the several States, in behalf of whose citizens they address you.

Your memorialists do not presume to prescribe to your better judgment, the extent, or the conditions of any subscription, which the interests of the Union and your wisdom may sanction. They solicit an ample investigation of all the grounds, on which they rest their appeal to he policy of an enlightened, and to the zeal of a patriotic Legislature. They commit to you the fate of an enterprise, the practicability of which has already been placed beyond the possibility of doubt: the accomplishment of which is obviously within your power; and which, if accomplished, cannot but redound to the honor of the age, and to the prosperity of the country which shall give it birth, and conduct it to maturity.

If they may be allowed to enlarge on so fruitful a topic, in the short compass of a Memorial, already, perhaps, too extended, they invite you to exercise the authority of a proprietor of the public property in this city, and of that which covers so large a region of the West, and to compute the almost incalculable value which the fulfilment of their purpose must add to the national domain.

As the Legislature of a District and People, whose hopes of future prosperity are wrapt up in this measure, and who have no other political guardian than yourselves, they ask of you the exercise of the provident care of an irresponsible, but paternal sovereign.

As the Federal Depository of the common safety from foreign danger, they appeal to your foresight, to profit by the past, and to provide, amidst the prosperity of peace, for the exigencies of future wars;—to accumulate, in an imperishable form, treasure, to defray its cost when such calamity shall unfortunately come, and to assure, by the same means, the prompt concentration, and speedy direction of the resources of the Union, for the defence and security of its members.

As the efficient spring of the diffusion of commercial, social, and political intelligence, over a widely extended territory, they ask you to facilitate the intercourse of its People, who, though divided by many chains of mountains, have a constitutional right to regard each other as fellow citizens, friends, and brothers.

As the only medium of negotiation among the several States of this Union, your memorialists ask the General Government to secure to those States, the practical benefit of a commercial intercourse with each other, and an open and easy access to the markets of the world. In regulating the trade of the Eastern and Western portions of this Union, by virtue of your acknowledged authority,—to afford to both, the readiest exchange of their respective superfluities, and to extend to labor and industry, by thus augmenting the value of their fruits, their appropriate and just reward.

As the equal guardian of the rights of all classes of society, may your memorialists not ask you to restore to agriculture, by cheapening the carriage of its heavy products, that surplus revenue, which has been avowedly created for the benefit of manufactures, and thus to enable internal trade to heal the dissensions of those jarring interests, by the interchange of reciprocal benefits?

Combining with multiplied powers of taxation, facilities of borrowing, enhanced by the superior credit of a common government, may not your memorialists appeal both to economy and justice, to reduce the cost of those public works, which, designed for the welfare of all the States, have a claim for their execution, on the common wealth? If any such work be the joint offspring of public and private contributions, and be also calculated greatly to increase the annual exports of the United States, in prescribing, by the most contracted policy, limits to its *cost*, the revenue resulting from the consequent augmentation of foreign imports should be computed along with the sum of its tolls: and, if the relative interest become the measure of the relative subscription of the Government, as a stockholder, to that of all other subscribers to the same work, this proportion cannot be computed at less, than the actual ratio of the aggregate of both sums, to that *cost*.

Finally, regarding you as the political bond of a common Union, your memorialists implore you to perpetuate its duration, by multiplying, in the simplest form, its most substantial blessings.

APPENDIX.

The following are the names of the Delegates composing the Chesapeake and Ohio Canal Convention, which met in the Capitol at Washington, Nov. 6, 1823.

FROM THE STATE OF OHIO.

Belmont County.

Benjamin Ruggles
Stephen Caldwell.

Jefferson county.

John C. Wright.

FROM THE STATE OF PENNSYLVANIA.

Fayette county.

Albert Gallatin
James Shriver.

FROM THE STATE OF VIRGINIA.

Frederick county.

A. H. Powell
William B. Page
James M. Mason
H. St. G. Tucker
John Mackey
William Barton
Nathaniel Burwell.

Prince William county.

John Gibson
John M'Crea
William Hebb
John Hooe
Redman Foster
Walter Harrison.

Fairfax county.

William H. Fitzhugh
R. T. Thompson
John Moore
William Moss
John C. Hunter
Thomas Moss.

Shenandoah county.

William Stenberger
Benjamin Blackford
Robert Allen
Anthony Spengler
J. S. Spengler
William Carson
Isaac Overall
Joseph Arthur.

Berkeley county.

Edward Colston
John R. Cook
Philip E. Pendleton
Moses T. Hunter
Joel Ward
William Short
Elisha Boyd
Israel Robinson.

Jefferson county.

Hierome L. Opie
Daniel Morgan
Bushrod C. Washington
Braxton Davenport
Joseph McMurran
William Butler
Richard E. Byrd
Henry Boteler

John Peter
Andrew Kennedy
Henry S. Turner
Henry Berry
John T. Cookus
George Reynolds
Philip P. Hunter.

Hardy county.

Joseph Williams
John J. Vanmetre
Mortimer D. Williams.

Hampshire county.

William Donaldson
William Armstrong
Warner Throckmorton
Robert Sherrard
William Naylor
Samuel Kercheval, Jr.

Morgan county.

Cromwell Arrick
Gassaway Cross
Joseph H. Sherrard
James Macky
Stephen Ogden
John Sherrard.

Harrison county.

Daniel Kincheloe
John Cother
Edwin S. Duncan
James Pindall
Benjamin Reeder
John Webster.

Loudoun county.

Charles F. Mercer
William Elzey
William Chilton
W. T. T. Mason
W. M. McCarty
R. H. Henderson.

Fauquier county.

Berkley Ward
John P. Smith
T. T. Fauntleroy
Epper Hunter
John R. Wallace
Henry Fitzhugh
John Marshall, Jr.

Ohio county.

Noah Zane
David Shriver
James Shannon.

Preston county.

George Hagan.

FROM THE STATE OF MARYLAND.

Washington county.

Thomas Buchanan
Thomas C. Brent
Casper W. Wever
John R. Dall
Otho H. Williams
William Fitzhugh
Thomas Kennedy
Marmaduke W. Boyd
Frisby Tilghman
John Blackford.

Prince George's county.

Joseph Kent
John C Herbert
Benedict J. Semmes
Edmund B. Duvall
William T. Wootten
Abraham Clark
Thomas Law
George Semmes
Julius Forrest
Robert W. Bowie

Alleghany county.

John M'Henry
John M'Mahan
Michael C. Sprigg
George Bruce
John Hoye
Upton Bruce
Jacob Lance.

Montgomery county.

John A. T. Kilgour
Isaac Briggs
George Peter
George C. Washington
Johnson Hellen
Archibald Lee
John Wootten
Benjamin S. Forrest
Elisha W. Williams
James W. Anderson.

Frederick county.

William Goldsborough
B. S. Pigman
William Tyler
John McPherson
Grafton Duvall
John Lee.

Charles county.

Alexander Greer
John Barnes
George Mason
Wilfred Manning
John G. Chapman
William Matthews
Francis Digges
Daniel Jenifer.

St. Mary's county.

James Forrest
G. N. Caustin
Athanasius Fenwick
Peter Gough
William B. Scott
E. J. Millard.

City of Annapolis.

Jeremiah Hughes
Thomas H. Carroll.

FROM THE DISTRICT OF COLUMBIA.

Washington City.

John Davidson
E. B. Caldwell
R. C. Weightman
Thomas Carbery
Walter Jones
Thomas Munroe
Wm. W. Seaton

Washington County.

N. Luffborough
S. H. Smith
Thomas Corcoran.

Georgetown.

John Mason
John Cox
Walter Smith
Clement Smith
Francis S. Key
John Laird
John McLean.

Alexandria.

Thomas Swann
Jonathan Swift
Humphrey Peake
Phineas Janney
Robert J. Taylor
Charles J. Catlett.

Levy Court of Alexandria.

Christopher Neale
Jacob Morgan
Amos Alexander.

By the Landholders of the District.

David Porter
Joseph Pearson
G. W. P. Custis.

At a Convention of Delegates, from the States of Virginia, Maryland, Pennsylvania, Ohio, and the District of Columbia, holden at the Capitol, in the City of Washington, on the 6th, 7th, and 8th of November, 1823, the following preamble and resolutions were considered and adopted:

Whereas a connection of the Atlantic and Western Waters, by a Canal leading from the seat of the General Government to the River Ohio, regarded as a local object, is one of the highest importance to the States immediately interested therein, and, considered in a national view, is of inestimable consequence to the future union, security, and happiness, of the United States:

Resolved, unanimously, That it is expedient to substitute, for the present defective navigation of the Potomac River above tide water, a navigable Canal, by Cumberland to the mouth of Savage Creek, at the eastern base of the Alleghany, and to extend such Canal, as soon thereafter as practicable, to the highest constant steam-boat navigation of the Monongahela or Ohio River.

That the most eligible mode of attaining this object, will be by the incorporation of a joint stock company, empowered to cut the said Canal through the Territory of the United States in the District of Columbia, and of the States of Virginia, Maryland, and Pennsylvania; and, therefore, that committees be appointed, each consisting of five Delegates, to prepare and present, in behalf of this Assembly, and in co-operation with the Central Committee, hereinafter provided, suitable memorials to the Congress of the United States, and the Legislatures of the several States before named, requesting their concurrence in the incorporation of such a company, and their co-operation, if necessary, in the subscription of funds for the completion of the said Canal:

And, whereas, by an act of the General Assembly of the State of Virginia, which passed the 22d February, 1823, entitled "An act incorporating the Potomac Canal Company," the assent of that State, so far as the limits of her territory renders it necessary, is already given to this *object*, and for *its* enlargement, to the extent required by the preceding resolution, the said act appears to furnish, with proper amendments, a sufficient basis:

Be it therefore Resolved, That it will be expedient to accept the same as a charter for the proposed Company, with the following modifications, viz:

That, in reference to its enlarged purpose, the name be changed to "The Chesapeake and Ohio Canal."

That provision be made for the assent of the Government of the United States, and of the State of Pennsylvania, to the said act, and that the act be made to correspond in its details with such provision.

That the Union Canal shall be divided into two sections, Eastern and Western; the former of which shall correspond in description with that of the Chesapeake and Ohio Canal, by the preceding resolution, and the latter shall begin at the western extremity of the former,

and terminate at the head of the steam-boat navigation of the Monongahela or Ohio River.

That while the act shall allow a reasonable time for the commencement and completion of both sections of the Canal, no other forfeiture shall be incurred, after the eastern section is finished, for a failure to begin or complete the western section, within the term prescribed, except of the right to complete such section and of all interest therein.

That, while the consent of Pennsylvania is provided for, in the amended act, it shall not be indispenably requisite to the validity of the charter, so far as respects the authority granted by it, to extend the Union Canal to the Pennsylvania line.

That it will be both just and expedient, if not absolutely necessary, to limit the interest of the stockholders of the Potomac Company, in the stock of the Chesapeake and Ohio Canal, in the mode provided by the unanimous resolution of the company, of the 7th day of February last, a copy of which is hereto annexed.

That the said Canal shall not, in width, be less at the surface than 40 feet, at its bottom than 28, nor its depth of water be short of four feet, except where, from the nature of the ground, it may be necessary, for the greater security of the banks of the Canal, to reduce its breadth at its base to less than 28 feet.

That the act aforesaid be amended, by inserting, in lieu of the 18th section thereof, the following:

And be it further enacted, The right to the waters of the River Potomac, for the purpose of any lateral Canal or Canals, which the State of Virginia or Maryland may authorize to be made, in connection with the said Canal, is reserved to the said States respectively: that a similar right is reserved to the State of Pennsylvania in relation to the rivers and streams within the territory of that State, the waters of which may be used in supplying the western section of the said Canal: that the Government of the United States shall retain the power to extend the said Canal in or through the District of Columbia, on either or both sides of the River Potomac; and the State of Maryland or Virginia shall be empowered, under the sanction given by the United States to this act, to authorize any such extension for the purpose of meeting any Canal so extended, by any other Canal which either State may deem it expedient to conduct in any direction whatever through its territory.

Provided, however, That no part of the waters of the River Potomac, or of any other river or stream, required to ensure the constant, safe, and convenient use of the navigation of the Canal hereby authorized to be made, shall be, by any such lateral or continued Canal, diverted therefrom to the impediment or injury of the said navigation.

That, in addition to the provision contained in the first section of the act aforesaid, there be grounded, on the event of its failure to furnish adequate funds for the completion of the Eastern Section of the Canal, to be obtained through separate acts of the respective Governments and Corporations, of the States of Maryland and Virginia, of the United States, and of the three Cities of the District of Columbia,

a subscription, to the amount, if necessary, of 2,750,000 dollars, in the following proportions: $\frac{2}{11}$ to be subscribed by the State of Maryland, $\frac{3}{11}$ by the State of Virginia, $\frac{4}{11}$ by the United States, and $\frac{2}{11}$ by the District Cities, to be divided between them, according to an equitable ratio, to be fixed by themselves. In case a part of the sum aforesaid shall be subscribed, by private individuals, in the mode provided by the act aforesaid, the several States and Corporations, within which such individual subscriptions are received, shall be requested to assume, as part of their aforesaid quotas, the amount of such subscription, under such security as they may deem expedient for the payment thereof, by the subscribers, to them respectively.

That the Government of the United States be earnestly solicited to obtain the whole of this sum on loan, receivable in four annual instalments, upon the issue of certificates of stock, bearing an annual interest, not exceeding five per cent., and irredeemable for thirty years, and to guaranty the repayment thereof on a specific pledge of the public lots in the City of Washington, of the United States' stock in the Canal, and the public faith.

That the first instalment of the loan be made payable on the 1st of March, 1825, and the last on the 1st of March, 1829.

That the interest of each State and Corporation upon its proportion of the said loan be paid into the Treasury of the United States, according to the terms of the loan, and the principal sum at the expiration of thirty years, the period to be fixed for its redemption.

That, in the event of a refusal by the Government of the United States to negotiate the said loan, each State and Corporation shall provide the amount of its respective subscription in such manner as may seem to it best.

That the maximum profit of the said Company shall not exceed 15 per cent. after the entire Canal shall have been completed; but, if, at at any time after the completion of the eastern section thereof, and before sufficient funds shall have been otherwise provided for the completion of the western, the tolls of the Canal shall yield a nett income to the stockholders exceeding ten per cent. per annum, such excess shall be applied towards the extension of the Canal until the western section shall have been completed; and to give more speedy effect to this provision, the President and Directors of the Chesapeake and Ohio Canal Company shall be authorized to borrow, or may negotiate, through a suitable agency, in behalf of the Company on the credit of such excess, or on the tolls or a fixed part thereof, levied upon certain commodities passing through the said Canal, being the probable amount of such annual excess, such sums of money as may be deemed expedient, by a general meeting of the Stockholders, to be applied to the extension of the western section of the Canal, from time to time, till the said section shall have been completed. And if, after the completion of the entire Canal, the nett dividends shall exceed 15 per cent. per annum, such excess shall be applied, first to strengthening the works of the Canal, next to the multiplication of ascending locks from the River Potomac to the level of the Canal, wherever the convenience of

the adjacent country may require it; next, to lining the Canal throughout, with such walls of stones as shall accommodate its banks to the use of steam-boats; and should the nett dividends still exceed fifteen per cent. then such excess shall be applied to the reduction of the tolls upon the said Canal, according to some equitable scale.

And be it further Resolved, That a Committee of five Delegates be appointed to prepare, and cause to be presented, in behalf of this Convention, a suitable memorial to the State of Ohio, soliciting the co-operation of that State in the completion of the Chesapeake and Ohio Canal, and its ultimate connection with the navigation of Lake Erie; and that, for the latter purpose, the memorial shall respectfully suggest the expediency of causing the country, between the northernmost bend of the River Ohio, and the southern shore of Lake Erie, together with the waters of Great Beaver and Cayuga Creeks, and all other intervening waters near the said route, to be carefully surveyed, with the view of ascertaining the practicability and probable cost of a Canal, which, fed by the latter, shall connect the former.

That a letter be addressed by the Chairman of the Convention, to the Mayors of Alexandria, Georgetown, and Washington, apprising, through them, their respective Corporations, of the proceedings of this Convention, and inviting their zealous co-operation in giving to them effect.

That another letter be addressed, by the Chairman, in behalf of this Convention, to the President and Directors of the Potomac Company, requesting their concurrence in the measures recommended by the preceding resolutions.

Resolved, That the Committee before named be, and they are hereby, authorized and requested to use their best exertions to obtain the most favorable reception for their memorials, to ascertain and communicate to the Central Corresponding Committee, hereinafter named, such objections, if any, as are opposed to the prayers of their respective memorials, and to devise, if possible, in conjunction with the common friends of the union and prosperity of the United States, the means of obviating all the impediments to their success.

Resolved, That, for the last mentioned purpose, the Delegates of the respective Counties and Corporations, represented in this Convention, be regarded also as Corresponding Committees, and that 13 Delegates be appointed a Central Committee of Correspondence; to confer with the Committees before named, and to hold stated meetings in the City of Washington, for the purpose of consulting upon, and adopting in behalf of, the Chesapeake and Ohio Canal, such measures as may seem best calculated to assure its certain and speedy completion.

JOSEPH KENT, *Chairman.*

WALTER JONES, *Secretary.*

List of the several Committees appointed by the Chairman, in pursuance of the resolutions of the Chesapeake and Ohio Canal Convention.

The Central Committee.

Charles F. Mercer
John Mason
Walter Jones
Thomas Swann
John McLean
Wm. H. Fitzhugh
H. L. Opie
Alfred H. Powell
P. C. Pendleton
A. Fenwick
John Lee
Frisby Tilghman
Robert W. Bowie.

Committee for Virginia.

Philip C. Pendleton
H. L. Opie
J. C. Hunter
W. Ellzey
Nathaniel Burwell

Committee for Pennsylvania.

James Shriver
James Shannon
John McMahan
Daniel Kincheloe
George Hagan.

Committee for Maryland.

Grafton Duvall
Geo. Mason, of Chas. co.
T. Kennedy
J. C. Herbert
James Forrest.

Committee for Ohio.

John McLean
Walter Smith
Benj. S. Forrest
Thos. Carbery
H. Peake.

To Memorialize Congress.

Walter Jones
John Mason
G. W. P. Custis
Robert I. Taylor
S. H. Smith.

Extract from the President's Message to Congress, at the commencement of the Session, Dec. 3, 1823.

"Many patriotic and enlightened citizens, who have made the subject an object of particular investigation, have suggested an improvement of still greater importance. They are of opinion that the waters of the Chesapeake and Ohio may be connected together by one continued canal, and at an expense far short of the value and importance of the object to be obtained. If this could be accomplished, it is impossible to calculate the beneficial consequences which would result from it. A great portion of the produce of the very fertile country through which it would pass, would find a market through that channel. Troops might be moved with great facility in war, with cannon, and every

kind of munition, and in either direction. Connecting the Atlantic with the Western country, in a line passing through the Seat of the National Government, it would contribute essentially to strengthen the bond of union itself. Believing, as I do, that Congress possess the right to appropriate money for such a national object, (the jurisdiction remaining to the States through which the canal would pass.) I submit it to your consideration whether it may not be advisable to authorize, by an adequate appropriation, the employment of a suitable number of the officers of the Corps of Engineers, to examine the unexplored ground, during the next season, and to report their opinion thereon. It will likewise be proper to extend their examination to the several routes through which the waters of the Ohio may be connected, by canals, with those of Lake Erie."

ACT OF THE STATE OF VIRGINIA.

An act incorporating the Chesapeake and Ohio Canal Company.—[Passed January 27, 1824.]

Whereas a navigable canal from the tide water of the river Potomac, in the District of Columbia, to the mouth of Savage creek, on the north branch of said river, and extending thence, across the Alleghany mountain, to some convenient point on the navigable waters of the river Ohio, or some one of its tributary streams, to be fed, through its course on the east side of the mountain, by the river Potomac and the streams which empty therein, and on the western side of the mountain, and in passing over the same, by all such streams of water as may be beneficially drawn thereto by feeders, dams, or any other practicable mode, will be a work of great profit and advantage to the people of this State, and of the neighboring States, and may ultimately tend to establish a connected navigation between the eastern and western waters, so as to extend and multiply the means and facilities of internal commerce, and personal intercourse between the two great sections of the United States, and to interweave more closely all the mutual interests and affections that are calculated to consolidate and perpetuate the vital principles of Union; and whereas it is represented to this General Assembly, that the Potomac Company are willing and desirous that a charter shall be granted to a new company, upon the terms and conditions hereinafter expressed; and that the charter of the present company shall cease and determine:

1. *Be it therefore enacted by the General Assembly of Virginia*, That, as soon as the Legislatures of Maryland and Pennsylvania, and the Congress of the United States, shall assent to the provisions of this act, and the Potomac company shall have signified their assent to the same, by their corporate act, a copy whereof shall be delivered to the Executives of the several States aforesaid, and to the Secretary of

the Treasury of the United States, there shall be appointed by the said Executives and the President of the United States, three commissioners on the part of each State, and the Government of the United States, any one of whom shall be competent to act for his respective government. The said commissioners shall cause books to be opened at such times and places as they shall think fit, in their respective States, and the District of Columbia, under the management of such persons as they shall appoint, for receiving subscriptions to the capital stock of the company hereinafter incorporated; which subscriptions may be made, either in person or by power of attorney; and notice shall be given in such manner as may be deemed advisable, by one or more of the said commissioners, of the time and places of opening the books

2. And the said commissioners shall cause the books to be kept open at least forty days. And within twenty days after the expiration thereof, shall call a general meeting of the subscribers at the city of Washington, of which meeting notice shall be given, by a majority of the commissioners aforesaid, in at least four of the newspapers printed in Pennsylvania, Maryland, Virginia, and the District of Columbia, at least twenty days next before the said meeting; and such meeting shall, and may be continued from day to day until the business is finished; and the commissioners at the time and place aforesaid, shall lay before such of the subscribers as shall meet according to the said notice, the book containing the state of the said subscriptions: and, if one fourth of the capital sum of six millions of dollars should appear not to have been subscribed, then the said commissioners, or a majority of them, at the said meeting, are empowered to take and receive subscriptions to make up such deficiency, and may continue to take and receive such subscriptions for the term of twelve months thereafter; and a just and true list of all the subscribers, with the sum subscribed by each, shall be made out, and returned by the said commissioners, or by a majority of them, under their hands, to the Board of Public Works of this State, to the Governor and Council of the State of Maryland, to the Secretary of State of the State of Pennsylvania, and to the Secretary of the Treasury of the United States, to be carefully preserved; and in case more than six millions of dollars shall be subscribed, then the sum subscribed shall be reduced to that amount, by the said commissioners, or a majority of them, by beginning at and striking off a share from the largest subscription or subscriptions, and continuing to strike off a share from all subscriptions under the largest and above one share, until the same is reduced to the capital aforesaid, or until a share is taken from all subscriptions above one share; and lots shall be drawn between subscribers of equal sums, to determine the number of shares which each subscriber shall be allowed to hold, on a list to be made for striking off as aforesaid; and if the sum subscribed still exceed the capital aforesaid, then to strike off by the same rule, until the sum subscribed is reduced to the capital aforesaid, or all the subscriptions reduced to one share respectively; and, if there still be an excess, then lots shall be drawn to determine the subscribers who are to be excluded, in order to re-

duce the subscription to the capital aforesaid; which striking off shall be certified on the lists aforesaid; and the said capital stock of the company, hereby incorporated, shall consist of six millions of dollars, divided into sixty thousand shares, of one hundred dollars each; of which every person subscribing may take, and subscribe for one or more whole shares; and such subscriptions may be paid and discharged either in the legal currency of the United States, or in the certificates of stock of the present Potomac company, at the par or nominal value thereof, or in the claims of the creditors of the said company, certified by the acting president and directors to have been due, for principal and debt, on the day on which the assent of the said company shall have been signified by their corporate act as hereinbefore required: *Provided*, that the said certificates of stock shall not exceed, in the whole amount, the sum of three hundred and eleven thousand one hundred and eleven dollars and eleven cents; nor the said claims the sum of one hundred and seventy-five thousand eight hundred dollars: *Provided, also*, that the stock so paid for in certificates of the stock of the present company, and of the debts due from the said company, shall be entitled to dividend, only as hereinafter provided: and that no payment shall be received, in such certificates of stock, until the Potomac company shall have executed the conveyance prescribed by the thirteenth section of this act: *And, provided*, that, unless one-fourth of the said capital shall be subscribed, as aforesaid, all subscriptions made in consequence of this act, shall be void; and, in case one-fourth, and less than the whole capital, shall be subscribed as aforesaid, then the said commissioners, or a majority of them, are hereby empowered and directed to take and receive the subscriptions, which shall first be offered in whole shares, as aforesaid, until the deficiency shall be made up; a certificate of which additional subscription shall be made, under the hands of said commissioners, or a majority of them, for the time being, and returned as aforesaid.

3. *And be it further enacted*, That, whenever one-fourth, or a greater part of the said stock shall have been subscribed, in the manner aforesaid, then the subscribers, their heirs, and assigns, shall be, and are hereby declared to be, incorporated into a company, by the name of the "Chesapeake and Ohio Canal Company," and may sue, and be sued, and, as such, shall have perpetual succession, and a common seal; and the estates, rights, and interests of the said company, shall be adjudged and taken in law to be real estate; and it shall, thereupon, be the duty of the said commissioners, or a majority of them, to call a general meeting of the said subscribers, at such time and place as they, or a majority of them, shall appoint, after advertising the same, in such public prints as they, or a majority of them, may think proper; and such of the said subscribers as shall be present at the said meeting, or a majority of them, are hereby empowered and required to elect a president and six directors, for conducting the said undertaking, and managing all the said company's business and concerns, for, and during such time, not exceeding three years, as

the said subscribers, or a majority of them, shall think fit; and, in counting the votes of all general meetings of the said company, each member shall be allowed one vote for every share, as far as ten shares, and one vote for every five shares above ten, by him or her held at the time, in the stock of the said company; and any proprietor, by writing, under his or her hand, executed before two witnesses, may depute any other member or proprietor, to vote and act as proxy for him or her, at any general meeting: *Provided, also,* That no officer or director of said company shall, under any circumstances, be allowed to vote on any stock but his own.

4. *And be it further enacted,* That the said president and directors, and their successors, or a majority of them, assembled, shall have full power and authority to appoint, and, at their pleasure, dismiss such engineer or engineers, and agent or agents, as they may deem expedient, and to fix their compensation; and to agree with any person or persons, on behalf of the said company, to cut canals, erect dams, open feeders, construct locks, and perform such other works, as they shall judge necessary or expedient, for completing the canal hereinbefore mentioned and described; and, out of the money arising from the subscriptions, and tolls, and other aids, hereinafter given, to pay for the same, and to repair and keep in order the said canals, locks, and other works necessary thereto, and to defray all incidental charges; and also to appoint a treasurer, clerk, and other officers, toll-gatherers, managers, and servants, as they shall judge requisite, and to agree for, and settle, their respective wages or allowances; and to settle, pass, and sign their accounts; and also to make and establish rules of proceeding, and to transact all other business and concerns of the said company, in and during the intervals between the general meetings of the same; and they shall be allowed, as a compensation for their trouble therein, such sum of money as shall, by a general meeting of the stockholders, be determined: *Provided always,* That the Treasurer shall give bond, in such penalty, and with such security, as the said president and directors, or a majority of them, shall direct, for the true and faithful discharge of the trust reposed in him, and that the allowance to be made him for his services, shall not exceed three dollars in the hundred for the disbursements by him made; and that no officer in the company shall have any vote in the settlement or passing of his own account.

5. *And be it further enacted,* That, on all subscriptions which shall not be paid, as hereinbefore provided, in certificates of the stock, or debts of the present Potomac company, there shall be paid at the time of subscription, on each share one dollar; and thereafter when the company shall be formed, the stock subscribed shall be paid on such instalments, and at such times, as the president and directors shall, from time to time, require, as the work advances: *Provided,* That not more than one-third part shall be demanded within any year from the commencement of the work; nor any payment demanded, within any year, from the commencement of the work; nor any payment demanded, until at least sixty days public notice thereof shall have been given, in such public newspapers as the said president and directors

shall direct such notices to be published in; and, whenever any subscriber shall fail to pay any instalment, called for by the company, it shall and may be lawful for the company, upon motion to be made in any court of record, after ten days' notice, to obtain judgment against the subscriber so failing to pay; or the said company, at their option, may, after giving sixty days notice, in such public newspaper, printed within the District of Columbia, as they may judge proper, sell the stock of such subscriber; and, if the proceeds of any such sale shall exceed the sum demanded, the surplus, after paying the expenses of such sale, shall be paid to the subscriber so failing, or to his legal representatives; and the purchaser, at such sale, shall become a stockholder, and be subject to the same rules and regulations, and entitled to the same privileges, rights, and emoluments, as original subscribers under this act.

6. And to continue the succession of the said president and directors, and to keep up the same number; *Be it enacted*, That, from time to time, upon the expiration of the said term for which the said president and directors were appointed, the stockholders of the said company, at the next general meeting, shall either continue the said president or directors, or any of them, or choose others in their stead, and, until such choice be made, the president and directors for the time being, shall continue in office; and, in case of the death, removal, resignation, or incapacity of the president, or any of the said directors, may and shall, in manner aforesaid, elect any other person or persons to be president and directors, in the room of him or them so dying, removing, or resigning; and may, at any of their general meetings, remove the president, or any of the directors, and appoint others for and during the remainder of the term for which such person or persons were at first to have acted.

7. *And be it enacted*, That every president and director, before he acts as such, shall take an oath or affirmation for the due execution of his office.

8. *And be it enacted*, That the presence of stockholders, having a major part of the stock at least, shall be necessary to constitute a general meeting of the stockholders, which shall be held on the first Monday in June in every year, at such convenient town or place as shall be, from time to time, appointed by the said general meeting: but, if a sufficient number shall not attend on that day, the stockholders who do attend, may adjourn from time to time, until the stockholders holding the major part of the stock do attend, and the business of the company is finished; to which meeting the president and directors shall make report, and render distinct accounts of all their proceedings; and, on finding them fairly and justly stated, the stockholders then present, or a majority of them, shall give a certificate thereof, a duplicate of which shall be entered on the company's books; and at such yearly general meetings, after leaving in the hands of the treasurer such sums as the stockholders, or a majority of them, shall judge necessary for repairs and contingent charges, an equal dividend of all the nett profits arising from the tolls hereby granted, shall be ordered and made to and among all the stockholders of the said com-

pany, in proportion to their several shares, subject to the provisions and enactments hereinafter declared; and, upon any emergency in the interval between the said yearly meetings, the said president, or a majority of the said directors, may appoint a general meeting of the stockholders of the company, at any convenient town or place, giving at least one month's previous notice, in at least four of the newspapers in Pennsylvania, Maryland, Virginia, and the District of Columbia; which meeting may be adjourned and continued as aforesaid: and in case the stockholders, or a majority of them, in any general meeting aforesaid, shall deem it expedient to order a semi-annual, rather than a yearly dividend as aforesaid, then, in like manner, with like notice, and under like restrictions, there shall be a half-yearly, or semi-annual dividend of nett profits declared and paid.

9. *And be it enacted*, That, for and in consideration of the expenses the said stockholders will be at, not only in cutting the said canal, erecting locks and dams, providing aqueducts, feeders, and other works, and in improving and keeping the same in repair, the said canal and all other works aforesaid, or required to improve the navigation thereof, at any time hereafter, with all their profits, subject to the limitations herein provided, and to none other, shall be, and the same are hereby, vested in the said stockholders, their heirs and assigns, forever, as tenants in common, in proportion to their respective shares, and be forever exempt from the payment of any tax, imposition, or assessment, whatsoever: and that it shall and may be lawful for the said president and directors, at all times, forever hereafter, to demand and receive, at such places as shall hereafter be appointed by the president and directors aforesaid, tolls for the passage of vessels, boats, rafts, produce, and all other articles, at such rates as the said president and directors may hereafter allow and establish, according to the provisions of this act.

10. *And be it enacted*, That if the commissioners hereby required to be appointed, shall die, resign, or refuse to act, the vacancy occasioned thereby shall be filled by the same authority by which the original appointment was made; and the person or persons appointed to fill such vacancy, shall have all the power and authority which was vested in the commissioner whose place he or they shall be appointed to supply: and when any part of the canal aforesaid shall have been completed, according to the true intent and meaning of this act, the president and directors of the company hereby created, shall have power, and it shall be their duty to ordain and establish a rate of tolls to be paid upon boats, vessels, rafts, or other property, passing on the part of the canal so completed, and so, from time to time, as part or parts shall be completed; and until the eastern section thereof shall be finished up to the mouth of Savage river or creek; and, thereafter, until the entire canal shall have been finished according to the true intent and meaning of this act. For the collection of which tolls, the president and directors shall have power to establish so many toll-houses, and at their pleasure to appoint and remove so many collectors, and at such places as from time to time they may judge expe-

dient; and the said president and directors shall have full authority, subject to the direction and control of a majority, in interest, of the stockholders represented in any general meeting, to regulate and fix a tariff of tolls, not exceeding an average of two cents per ton per mile; and so to adjust the said tolls, in relation to the capacity or burthen of the boats, and the dimensions of the rafts passing the locks of the said canal, as to promote economy of water and time in the navigation thereof.

11. *And be it enacted*, That the president and directors shall, annually, or semi-annually, declare and make such dividend of the nett profits, from the tolls to be received according to the provisions of this act, and from the other resources of the company, as they may deem advisable, after deducting therefrom the necessary current, and the probable contingent expenses, to be divided among the proprietors of the stock of the said company, in proportion to their respective shares, in manner following; that is to say: if such nett profits shall not exceed ten per cent. on the amount of shares, which shall have been paid for in current money of the United States, and expended on the eastern section of the said canal, then the whole thereof shall be divided among the holders of such shares, in proportion to their respective shares; but, if such nett profits shall exceed the rate of ten per cent. per annum in any year, on such amount of stock, then the surplus shall be divided among such stockholders as shall have paid for their shares in certificates of the debts of the Potomac company, until they shall therefrom have received a dividend of six per cent.; and, if a surplus yet remain, the same shall be divided among the stockholders who shall have paid for their shares in certificates of the stock of the Potomac company, until they shall have received therefrom a dividend of six per cent. per annum on such shares; and if a surplus still remain, so long as the western section of the canal shall remain unfinished, such surplus shall be applied, from time to time, to the construction and completion thereof, in such mode as the president and directors, under such rules and regulations, not inconsistent with the constitution of the United States, or of the several States aforesaid, as the stockholders, or a majority thereof, in general meeting, may prescribe, until the western section of the canal shall be also completed; after which, if such surplus shall still arise, the same shall be divided among all the stockholders, without discrimination, in proportion to their respective shares, until the annual dividend thereon shall have reached fifteen per cent.; beyond which it shall never extend. But should the nett revenue of the company exceed that amount for any two years in succession, then such excess shall be applied, by the president and directors, in such mode as shall be agreed on by a majority of the stockholders convened in general meeting: first, to strengthening and improving the works of the canal of every description requiring the same: next, to the accommodation, where not already provided, of the inhabitants of the shores of the river Potomac, and of the country drained by the tributary streams thereof, now navigable, or which may hereafter become so,

by affording to them, in the best practicable mode, a safe and easy access to the canal, from the surface of the main river, and of the said streams emptying therein: and, last of all, to the erection of such walls of stone or other materials, along the water margin of the canal, as shall fit the same for the navigation of steam boats of a size adapted to the said canal. And should the said tolls continue, after all such improvements have been completed, to nett more than fifteen per cent. per annum to the stockholders for any two years in succession, the tolls upon the same shall be reduced, by the president and directors, according to some just and equitable ratio, till the said dividend shall fall to fifteen per cent. annum: *Provided*, that, should the said dividend thereafter sink below fifteen per cent. the said tolls, or a part thereof, may be renewed, till the said nett dividend reaches that amount. And for any, or all the within-mentioned purposes, the said president and directors are empowered to borrow, in behalf of the company, on the credit of such excess of tolls, such sum or sums of money, as they may deem expedient, at such rate of interest, and with such delay of payment, as they may stipulate, with the previous consent of a majority of the stockholders in general meeting convened.

12. *And be it further enacted*, That it shall be the duty of the president and directors of the Chesapeake and Ohio Canal Company, so long as there shall be and remain any creditor of the Potomac company, who shall not have vested his demand against the same in the stock of the Chesapeake and Ohio Canal Company, to pay to such creditor or creditors annually, such dividend, or proportion of the nett amount of the revenues of the Potomac Company, on an average of the last five years preceding the organization of the said proposed company, as the demand of the said creditor or creditors at this time, may bear to the whole debt of one hundred and seventy-five thousand eight hundred dollars.

13. *And be it further enacted*, That whenever the Potomac Company shall have declared its assent to the provisions of this act, in the manner hereinbefore provided, it shall be lawful for the said company to surrender its charter, and convey, in due form of law, to the Chesapeake and Ohio Canal Company, hereby incorporated, all the property, rights, and privileges by them owned, possessed and enjoyed, under the same; and thereupon it shall be lawful to and for the said company, hereby proposed to be created, to accept such surrender and transfer, and to hold, possess, use, and occupy, all the said property, rights, and privileges, in the same manner, and to the same effect, as the said Potomac company now hold, possess, and occupy the same by law; and thereupon the charter of the said Potomac Company shall be, and the same is hereby, vacated and annulled, and all the rights and powers thereby granted to the Potomac Company shall be vested in the company hereby incorporated; and it shall be the duty of the said last mentioned company, until every section of the contemplated canal shall be completed, so as to be used and enjoyed for the purposes of navigation, to keep the corresponding part of the river in a proper

state for navigation, and in good order as the same now is; and in default thereof, they shall be in all things responsible, in the same manner as the Potomac Company is now responsible. And in all rivulets, streams, creeks, and rivers. required for the western section of the said Chesapeake and Ohio Canal, the same rights shall be, and are hereby, vested in the Chesapeake and Ohio Canal Company by this act, as the charter of the Potomac Company vested in the said company in relation to the waters of the Potomac and the tributary streams thereof.

14. *And be it enacted*, That the said canal, and the works to be erected thereon in virtue of this act, when completed, shall forever thereafter be esteemed, and taken to be navigable as a public highway, free for the transportation of all goods, commodities, and produce whatever, on payment of the tolls to be imposed, as provided by this act; and no other toll or tax whatever, for the use of the said canal and the works thereon erected, shall, at any time hereafter be imposed, but by consent of the said States and of the United States.

15. And whereas it is necessary for the making of the said canal, locks, dams, ponds, feeders, and other works, that a provision should be made for condemning a quantity of land for the purpose: *Be it enacted*, that it shall and may be lawful for the said president and directors, or a majority of them, to agree with the owners of any land, through which the said canal is intended to pass, for the purchase or use and occupation thereof; and in case of disagreement, or in case the owner thereof shall be a femme covert, under age, non-compos, or out of the state or county, on application to a justice of the county in which such land shall be, the said justice of the peace shall issue his warrant, under his hand, to the sheriff of the county, to summon a jury of eighteen inhabitants of his county, not related to the parties, nor in any manner interested, to meet on the land to be valued, at a day to be expressed in the warrant, not less than ten, nor more than twenty days thereafter; and the sheriff, upon receiving the said warrant, shall forthwith summon the said jury, and, when met, shall administer an oath or affirmation, to every juryman who shall appear, being not less than twelve in number, that he will faithfully, justly, and impartially, value the land, and all damages the owner thereof shall sustain by cutting the canal through such land, or the partial or temporary appropriation, use, or occupation, of such land, according to the best of his skill and judgment. and that in such valuation he will not spare any person for favor or affection, nor any person grieve for malice, hatred or ill-will; and in every such valuation and assessment of damages, the jury shall be. and they are hereby instructed to consider, in determining and fixing the amount thereof, the actual benefit which will accrue to the owner from conducting the said canal through, or erecting any of the said works upon his land, and to regulate their verdict thereby; except that no assessment shall require any such owner to pay, or contribute any thing to the said company where such benefit shall exceed, in the estimate of the jury, the value and damages ascertained as aforesaid; and the inquisition thereupon taken, shall be signed by the sheriff and some twelve or more of the

jury, and returned by the sheriff to the clerk or prothonotary of his county, and unless good cause be shewn against the said inquisition, it shall be affirmed by the court and recorded; but if the said inquisition should be set aside, or if from any cause no inquisition shall be returned to said court within a reasonable time, the said court may, at its discretion, as often as may be necessary, direct another inquisition to be taken in the manner above prescribed; and, upon every such valuation, the jury is hereby directed to describe and ascertain the bounds of the land by them valued, and the quality and duration of the interest and estate in the same, required by the said company for its use; and their valuation shall be conclusive on all persons, and shall be paid for by the said president and directors to the owner of the land or his legal representatives; and on payment thereof, the said company shall be seised of such land as of an absolute estate in perpetuity, or with such less quantity and duration of interest or estate in the same, or subject to such partial or temporary appropriation, use, or occupation, as shall be required and described, as aforesaid, as if conveyed by the owner to them. And whenever, in the construction of the said canal, or any of the works thereof, locks, dams, ponds, feeders, tunnels, aqueducts, culverts, bridges, or works of any other description whatsoever, appurtenant thereto, it shall be necessary to use earth, timber, stone or gravel, or any other material to be found on any of the lands adjacent or near thereto, and the said president and directors, or their agent, cannot procure the same for the works aforesaid, by private contract of the proprietor or owner, or in case the owner should be a femme covert, or non compos, or under age, or out of the state or county, the same proceedings in all respects shall be had as in the case before mentioned of the assessment and condemnation of the lands required for the said canal, or the works appurtenant thereto.

16. *And be it enacted*, That it shall be the duty of the company hereby incorporated, to cut, make, and construct, the said canal, with good and sufficient locks, on the most improved plan for expedition in the use thereof, and with a width of not less than forty feet at the surface of the water therein, or of twenty-eight feet at the bottom thereof, unless the quality of the soil shall require a narrow base to admit of a sufficient slope to preserve the banks from sliding down, and sufficient to admit, at all seasons, the navigation of boats and rafts, with a depth of four feet water at the least; and wherever wastes shall be essential to the security of the said canal, and in no other situation whatever, along the same, the waste water of the said canal may be, from time to time, sold or disposed of by the said company, for the purpose of supplying such works and machinery as require a water power. And along one side at least, of the said canal, and such aqueducts as it may render necessary, there shall be provided throughout its whole extent, a towing path of sufficient breadth to apply the power of horses to the navigation thereof.

17. *And be it enacted*, That it shall and may be lawful for any of the said stockholders to transfer his or her shares, by deed executed

before two witnesses, and registered, after the proof of the execution thereof, in the company's books, and not otherwise, except by devise, which devise shall also be exhibited to the president and directors, and registered in the company's books, before the devisee or devisees shall be entitled to draw any part of the profits from the said tolls or dividends: *Provided*, that no transfer shall be made, except for one or more whole share or shares, and not for part of such share or shares, and that no share or shares shall, at any time, be sold, conveyed, or held in trust, for the use and benefit, or in the name of another, whereby the said president and directors, or the stockholders of the said company, or any of them, shall or may be challenged, or made to answer concerning any such trust, but that every person appearing as aforesaid, to be a stockholder, shall, as to the others of the said company, be, to every intent, taken absolutely as such; but, as between any trustee, and the person for whose benefit any trust shall be created, the common remedy may be pursued.

18. *And be it enacted*, That if the said capital, and the other aids already granted by this act, shall prove insufficient, it shall and may be lawful for the said company, from time to time, to increase the said capital, by the addition of so many whole shares as shall be judged necessary by the said stockholders, or a majority of them, present at any general meeting of the said company; and the said president and directors, or a majority of them, are hereby empowered and required, after giving at least two months previous notice thereof, in at least four of the newspapers printed in Virginia, Pennsylvania, Maryland, and the District of Columbia, to open books in the beforementioned States and District, for receiving and entering such additional subscriptions, in which the stockholders of the said company for the time being, shall, and are hereby declared to have the preference of all others, for the first thirty days after the said books shall be opened as aforesaid, of taking and subscribing for so many whole shares, as any of them shall choose; and the said president and directors are hereby required to observe, in all other respects, the same rules therein, as are by this act prescribed, for receiving and adjusting the first subscriptions, and in like manner to return, under the hands of any three or more of them, an exact list of such additional subscriptions, with the sums subscribed, to the public authorities as aforesaid, to be by them preserved as aforesaid; and all stockholders of such additional shares shall, and are hereby declared to be, from thenceforward, incorporated into the said company.

19. *And be it enacted*, That, whenever it shall become necessary to subject the lands of any individual to the purposes provided for in this act, and their consent cannot be obtained, it shall and may be lawful for the company to enter upon such lands, and proceed to the execution of such works as may be requisite; and that the pendency of any proceedings in any suit, in the nature of a writ of ad quod damnum, or any other proceedings, shall not hinder or delay the progress of the work; and it shall be the duty of every court to give precedence to controversies which may arise between the company created by this

act, and the proprietors of land sought to be condemned for public uses, and to determine them in preference to all other causes.

20. *And be it enacted*, That the said canal shall be, and the same is hereby divided into two sections, to be denominated first and second, or eastern and western, respectively; that the first, or eastern section, shall begin at the District of Columbia, on tide water, and terminate at or near the bank of Savage river, or creek, which empties into the North branch of the Potomac, at the base of the Alleghany mountain; that the second, or western section, shall commence at the said termination, and extend along the valley of Savage river, or creek, so far as the same, or any branch thereof, as may reach some convenient point thereon, for connecting the eastern and western waters, by a tunnel through, or an open cut across the dividing ridge between the same, and thence, after crossing the said dividing ridge shall proceed to the highest steamboat navigation of the Ohio river, or of some one tributary stream thereof, in such direction as, in the opinion of the said president and directors, shall be best calculated for the attainment of the end set forth in the preamble of this act: that the said president and directors shall first construct the eastern section aforesaid, out of the capital stock hereinbefore mentioned, and shall next proceed to construct, with all possible, despatch the western section thereof. In case the said company shall not begin the said work within two years after the company shall have been formed, or if the work, having been so begun, shall not be diligently prosecuted, so that one hundred miles of the said canal, with the adequate locks and incidental improvements, shall not be completed, and in fit order for navigation, in the term of five years from the commencement of the work, then all interest of the said company, in the navigation and tolls, shall cease and determine, and their charter shall be thereafter taken to be null and void; and so, in like manner shall the said chaater be null and void, if the entire eastern section be not completed in the term of twelve years from the said commencement. And should the said company fail to begin the western section of the said canal, in two years after the time allowed as aforesaid for the completion of the eastern section; or, having begun the western section, shall fail to complete the same, in six years after such beginning, then all right, title, and interest, of the said company, in the said western section, shall cease and determine: and the several States aforesaid shall have full authority to incorporate another company for the completion of such section, or to complete the same in any other mode that they may deem expedient. And if, after the completion of the said canal and locks, the president and directors shall fail to keep the same in repair for twelve months at any time, then, in like manner, the interest of the company in the navigation and tolls shall cease, and their charter shall be forfeited.

21. *And be it further enacted*, That the right to the waters of the river Potomac, for the purpose of any lateral canal or canals, which the State of Virginia or Maryland may authorize to be made in connection with the said canal, is reserved to the said States, respectively;

that a similar right is reserved to the State of Pennsylvania in relation to the rivers and streams within the territory of that State, the waters of which may be used in supplying the western section of the said canal; that the Government of the United States shall retain the power to extend the said canal in or through the District of Columbia, on either or both sides of the river Potomac: *Provided*, That, before this act shall take effect, the Congress of the United States shall authorize the States of Virginia and Maryland, or either of them, to take and continue a canal from any point of the above named canal, or the termination thereof, through the territory of the District of Columbia, or any part thereof, to the territory of the said States, or either of them, in any direction they may deem proper, upon the same terms and conditions, and with all the rights, privileges, and powers, of every kind whatsoever, that the company incorporated by this act have to make the Chesapeake and Ohio Canal: *And provided, also*, That, in taking or extending such lateral canal or canals through the District of Columbia, by either of the said States, no impediment or injury be done to the navigation of the said Chesapeake and Ohio Canal.

22. This act, or so much thereof as respects the canal and works designed to be constructed in the District of Columbia, and the States of Virginia and Maryland, shall take effect, with such necessary modification in the construction thereof, as shall fit it for such limited application or use, upon the assent of the Congress of the United States and the Legislature of Maryland being given thereto; and upon its receiving the further assent of the Legislature of Pennsylvania, the whole, and every section and part thereof, shall be valid and in full force and operation.

23. *Be it further enacted*, That the assent of the Congress of the United States, required by the first section of this act, and the authority conferred by the fourteenth section, is understood and taken to relate only to their authority as the Legislature of the District of Columbia.

24. *Be it further enacted*, That all acts and parts of acts coming within the purview of this act, shall be, and the same are hereby, repealed.

RICHMOND, *Dec.* 30*th*, 1824.

The foregoing is a true copy of an act of the General Assembly of Virginia.

WM. MUNFORD,
Keeper of the Rolls.

AN ACT to amend the act, entitled "An act incorporating the Chesapeake and Ohio Canal Company," passed the 26th of January, 1826.

Whereas it appears to this General Assembly, that, in the proviso to the fifth section of the act, entitled "An act incorporating the Chesapeake and Ohio Canal Company," passed the 27th day of Jan-

uary, 1824, the following words, destructive of the intent and operation of the said section, have been inserted, to wit: "nor any payment demanded within any year from the commencement of the work:"

Be it therefore enacted, by the General Assembly of Virginia, That, so soon as the Legislatures of Maryland and Pennsylvania, and the Congress of the United States, as the Legislature of the District of Columbia, shall assent to this act, the words above quoted shall be repealed and expunged from the aforesaid proviso: and thenceforth the said proviso shall be construed in the same manner, and have the same effect, as if the aforerecited words had never been inserted therein.

I hereby certify that the foregoing is a true copy of an act passed during the present session of the Legislature of Virginia.

Given under my hand, (there being no seal of office,) this 30th day of January, 1826.

GEORGE W. MUNFORD,
Keeper of the Rolls for the State of Virginia.

ACT OF THE STATE OF MARYLAND.

AN ACT to confirm an act of the General Assembly of the State of Virginia, entitled "An act incorporating the Chesapeake and Ohio Canal Company."

Whereas the General Assembly of Virginia have heretofore, at the December session of the said General Assembly, in the year eighteen hundred and twenty-three, passed an act, entitled "An act incorporating the Chesapeake and Ohio Canal Company," in the substance, or words following:

[*See the preceding act.*]

Therefore, be it enacted by the General Assembly of Maryland, That the said act of the General Assembly of Virginia be, and the same is hereby accepted, assented to, and confirmed.

And be it further enacted and declared, That, by confirming and accepting the act of Virginia, it is not intended by the Legislature of Maryland to deny to the Congress of the United States the constitutional power to legislate on the subjects of roads and canals. And for the purpose of removing all doubt as to the right of the State of Maryland to intersect the said Chesapeake and Ohio Canal, for the purpose of conducting a lateral canal or canals to Baltimore, or elsewhere in the State of Maryland, from that part of the said Chesapeake and Ohio Canal which shall be within the District of Columbia—

Be it further enacted and declared, That the said act of Virginia has been accepted and confirmed by the Legislature of Maryland, on the express condition that the act of Congress contemplated by the twenty-first section of the Virginia act, shall direct and provide some safe and practicable mode whereby such lateral canal or canals may be secured to the State of Maryland, and whereby, also, it may be de-

termined whether such lateral canal or canals will injure the said Chesapeake and Ohio Canal, within the meaning and intention of the said twenty-first section of the Virginia act.

We hereby certify, that the foregoing is a true copy of the original act, as passed both branches of the Legislature, at December session, eighteen hundred and twenty-four.

WM. KILTY, *Clk. Senate of Md.*
JOHN BREWER, *Clk. House Del.*

Annapolis, Jan. 31, 1825.

ACT OF THE CONGRESS OF THE UNITED STATES.

An act confirming an act of the Legislature of Virginia, entitled "An act incorporating the Chesapeake and Ohio Canal Company," and an act of the State of Maryland, confirming the same.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the act of the Legislature of the State of Virginia, entitled "An act incorporating the Chesapeake and Ohio Canal Company," be, and the same is hereby, ratified and confirmed, so far as may be necessary for the purpose of enabling any company that may hereafter be formed by the authority of said act of incorporation, to carry into effect the provisions thereof, in the District of Columbia, within the exclusive jurisdiction of the United States, and no further.

Sec. 2. *And be it further enacted,* That, should the State of Virginia or Maryland desire, at any time, to avail itself of the right secured to it by the twenty-first section of the act aforesaid, to take and continue a canal from any point of the Chesapeake and Ohio Canal, to any other point within the territory of the District of Columbia, or through the same, on application to the President of the United States, by the Executive of the State, the President is authorized and empowered to depute three skilful Commissioners of the United States' Corps of Engineers, to survey and examine so much of the route of such canal as may affect, in any manner, the navigation of the Chesapeake and Ohio Canal. The said Commissioners, or a majority of them, shall ascertain, as far as practicable, whether the canal proposed to be constructed by the State aforesaid, will injure or impede the navigation of the Chesapeake and Ohio Canal, and report to the President of the United States the facts and reasons on which they may ground their judgment thereupon: which report shall be submitted to the Congress of the United States at their session next ensuing the date thereof, for their decision thereon; and if Congress shall be of opinion that the said canal may be cut in the manner proposed as

aforesaid, without impeding or injuring the navigation of the Chesapeake and Ohio Canal, the same shall be conclusive thereon.

H. CLAY,
Speaker of the House of Representatives.
JOHN GAILLARD,
President of the Senate, pro tempore.

WASHINGTON, *March* 3, 1825.—Approved:

JAMES MONROE.

PROCEEDINGS OF THE GENERAL MEETING OF THE POTOMAC COMPANY.

GEORGETOWN, D. C. 16*th May*, 1825.

At a special meeting of the stockholders of the Potomac Company, held this day at Semmes' Tavern, previous notice thereof having been given conformably to law—

The following resolutions were unanimously adopted:

That this meeting, having duly considered the act of the General Assembly of the State of Virginia, passed at the December session thereof, in the year 1823, entitled "An act incorporating the Chesapeake and Ohio Canal Company," and the acts of the General Assembly of Maryland, and of the Congress of the United States, confirming the same, and being willing and desirous that the charter shall be granted and confirmed to the said Chesapeake and Ohio Canal Company, do hereby declare the full and free assent of the Potomac Company to the said act incorporating the said Chesapeake and Ohio Canal Company, and to all the provisions thereof.

That the President of the Potomac Company be, and he is hereby, required to deliver to the Executives of the States of Virginia, Maryland, and Pennsylvania, respectively, and to the Secretary of the Treasury of the United States, copies of the aforegoing declaration of assent and corporate act of the Ptomac Company, as required by the 1st section of the Act of the General Assembly of Virginia, entitled "An act incorporating the Chesapeake and Ohio Canal Company."

That the President and Directors of the Potomac Company be, and they are hereby, authorized and required, in the name and behalf of this Company, whenever, agreeably to the terms and provisions of the aforesaid Act of Virginia, entitled "An act incorporating the Chesapeake and Ohio Canal Company," the subscribers therein mentioned and referred to, shall have become incorporated, to make a surrender of the Charter of the Potomac Company, to the said Chesapeake and Ohio Canal Company, and to convey in due form of law to the said Chesapeake and Ohio Canal Company, all the property, rights, and privileges, owned, possessed, and enjoyed, by the said

Potomac Company, under their said charter, to be held, used, and occupied, by the said Chesapeake and Ohio Canal Company, in the same manner and to the same effect, as the said Potomac Company now hold, possess, and occupy the same by law. And it is hereby resolved and declared, that, upon the completion of the said surrender and conveyance by the said President and Directors, to be evidenced by deed or deeds, in the name of this Company, under the hands of the said President and Directors, or a majority of them, and the corporate seal of this Company, the said charter shall be, and hereby is, effectually surrendered, and all the said property, rights, and privileges, shall be, and hereby are, effectually conveyed to the said Chesapeake and Ohio Canal Company, according to the tenor and effect, true intent and meaning, of the said act and acts so incorporating the Chesapeake and Ohio Canal Company, as aforesaid.

In testimony whereof, the corporate act as the Potomac Company, &c.

OFFICE OF THE POTOMAC COMPANY,
Georgetown, 16th May, 1825.

I hereby certify the aforegoing to be a true and faithful extract from the records of the proceedings of the Potomac Company.

ROB'T BERNARD,
Treas. and Clk. Poto. Com.

Extracts from the Charter of the Potomac Company,

Granted November, 1784.

Sec. 4. *And be it enacted,* That the said President and Directors, so elected, and their successors, or a majority of them assembled, shall have full power and authority to agree with any person or persons, on behalf of the said Company, to cut such canals, and erect such locks, and perform such other works as they may judge necessary, for opening, improving, and extending the navigation of the said river, above tide water, to the highest part of the North Branch, to which navigation can be extended, and carrying on the same from place to place, and from time to time, and upon such terms, and in such manner, as they shall think fit; and out of the money arising from the subscriptions and the tolls, and other aids hereinafter given, to pay for the same; and to repair and keep in order the said canals, locks, and other works, necessary thereto.

Sec. 11. And whereas it is necessary for the making of the said canal locks, and other works, that a provision should be made for condemning a quantity of land for the purpose: *Be it enacted.* That it shall and may be lawful for the said President and Directors, or a majority of them, to agree with the owners of any land through which the said

canal is intended to pass, for the purchase thereof; and, in case of disagreement, or in case the owner thereof shall be a *femme covert*, under age, *non compos*, or out of the State, on application to any two justices of the county in which such land shall lie, the said justices shall issue their warrant, under their hands, to the sheriff of their county, to summon a jury of twenty-four inhabitants of their county, of property and reputation, not related to the parties, nor in any manner interested, to meet on the land to be valued, at a day to be expressed in the warrant, not less than ten, nor more than twenty days thereafter; and the sheriff, upon receiving the said warrant, shall forthwith summon the said jury; and, when met, shall administer an oath, or affirmation, to every juryman that shall appear, that he will faithfully, justly, and impartially, value the land, (not exceeding, in any case, the width of two hundred feet,) and all damages the owner thereof shall sustain, by the cutting the canal through such land, according to the best of his skill and judgment; and that, in such valuation, he will not spare any person for favor or affection, nor any person grieve for hatred, malice, or ill will; and the inquisition thereupon taken shall be signed by the sheriff, and some twelve or more of the jury, and returned by the sheriff to the clerk of his county, to be by him recorded: And, upon every such valuation, the jury is hereby directed to describe and ascertain the bounds of the land by them valued, and their valuation shall be conclusive on all persons, and shall be paid by the said President and Directors to the owner of the land, or his legal representative: and, on payment thereof, the said Company shall be seized *in fee* of such land, as if conveyed by the owner to them and their successors by legal conveyance.

Sec. 12. *And be it enacted*, That the said President and Directors, or a majority of them, are hereby authorized to agree with the proprietor, for the purchase of a quantity of land, at or near such of the place of receipt of tolls aforesaid, for the purpose of erecting necessary buildings; and in case of disagreement, or any of the disabilities aforesaid, or the proprietor being out of the State, then such land may be valued, condemned, and paid for as aforesaid, for the purpose aforesaid; and the said company shall, upon the payment of the valuation of the said land, be seized thereof *in fee simple*, as aforesaid.

Sec. 13. And whereas some of the places through which it may be necessary to conduct the said canals may be convenient for erecting mills, forges, or other water-works, and the persons, possessors of such situation, may design to improve the same; and it is the intention of this act not to interfere with private property, but for the purpose of improving and perfecting the said navigation—*Be it enacted*, That the water, or any part thereof, conveyed through any canal or cut made by the said Company, shall not be used for any purpose but navigation, unless the consent of the proprietors of the land, through which the same shall be led, be first had.

Brief description of the Works executed by the Potomac Company, with the lockage and command of water thereon.

The Potomac Company, in pursuance of the powers granted to them, by their charter, have executed the following works:

1st. Large canals taken out of the river Potomac, and conveyed through locks around the principal Falls. Of these. the chief are the works of the Great Falls, where the difference of level, 76 feet 9 inches, is surmounted by a series of 5 sets of locks, of solid masonry of stone, each 100 feet in length, of the various width of from 10 to 14 feet; of the lift of from 10 to 18 feet; and of the cubical contents of from 18,000 to 25,000 feet; a set of guard-locks, and extensive basin. And a canal, in length 1200 yards, lined with walls of stone. Of the lock seats, the two lower pair have been excavated entirely from the solid rock, and exhibit an imperishable monument of perseverance and skill.

At this situation, the Potomac Company have acquired, in *fee simple*. 16 acres of land, at an uniform width of 140 feet, for the location of the canal and locks, and 1 acre further, for the erection of necessary buildings.

At the Little or Lower Falls, the difference of level, 37 feet 1 inch, is surmounted by a series of 4 sets of locks, of solid masonry of stone, of the dimensions of 80 feet in length, and 12 feet in width; and by a canal 2½ miles long, on the margin of which are found inexhaustible supplies of excellent and valuable stone, for building purposes; all which are within the land acquired by the Company, *in fee simple*. The quantity of land so possessed here by the Company, is 53 acres and 3 roods, at a constant width of 180 feet, and also one acre for the erection of necessary buildings.

The canals at both the Great and Little Falls, are excavated of the following dimensions:

25 feet wide at surface
20 " " bottom
4 " deep

2d. Works, erections of walls, and excavations in the body of the river, in order to confine the passages of the water within canals, of widths varying from 16 to 25 feet.

Dams of stone run across the river, leaving openings or sluices of similar widths; by which the water was raised in the river above them.

Removals of large stones and masses of rock, which presented obstacles to the passage of boats in the various channels of the river.

Similar to these were works executed on the Monocacy, Antietam, and Conogocheague Rivers, and very extensive operations upon the Shenandoah.

Under the improved mode of modern navigation by independent canals, the 2nd class of works, erected at enormous expense, at a time when such operations were completely new in the United States, and in the absence of that experience which modern times have derived

from the enlargement of scientific research, and the now constant application of practical skill in works of civil engineering, have been found to be entirely useless. And the property, rights, and privileges, of the Potomac Company, in and upon the river Shenandoah, have been by them long since conveyed, for certain considerations, to the Shenandoah Company—who now enjoy the same.

Commissioners appointed by the President of the United States, and the Governors of Maryland and Virginia, to open books for subscriptions to the Stock of the Chesapeake and Ohio Canal.

By the President—

SAMUEL H. SMITH,
ANTHONY C. CAZENAVE,
CLEMENT SMITH.

By the Governor of Maryland—

SAMUEL SPRIGG,
PHILIP E. THOMAS,
FRISBY TILGHMAN.

By the Governor of Virginia—

WILLIAM ELLZEY,
RICHARD H. HENDERSON,
JOHN C. HUNTER.

A GENERAL TABLE of the quantities of the various articles of produce, which have been brought from the upper country of the Potomac to tide water; the estimated value thereof; the tonnage employed in transporting the same; and the tolls collected thereon, from the 1st August, 1799, to 1st August, 1824.

Y'rs ending Aug.	Flour. Barrels.	Whiskey. Barrels.	Tobacco. hhds.	Iron. Tons.	Other articles. Estimated value.	Return goods. Estimated value.	Total estimated value.	Number of Boats.	Tonnage.	Tolls collected.
1800	16,584	84	25	- -	2,950	$ 7,851	$ 129,414	296	1,643	$ 2,138 58
1801	28,209	619½	100	187½	14,060	6,180	328,445	413	2,993	4,210 19
1802	17,250	379	5	238½	27,233	- -	163,916	305	1,952	3,479 69
1803	45,055	257	32	480½	3,936	10,386	345,473	493	5,549	9,353 93
1804	39,350	578	8	88	3,250	7,514	284,041	426	3,823	7,765 58
1805	28,507	436	11	137	32,975	7,486	340,334	405	3,208	5,213 24
1806	19,079	459	5	20½	3,553	4,998	86,790	203	1,226	2,123 69
1807	85,248	971	20	35	11,796	7,314	551,896	573	8,155	15,080 42
1808	48,463	1,535	3	13	10,532	7,613	337,008	508	5,994	9,924 27
1809	40,039	1,527	37	494	8,537	11,510	305,628	603	6,767	9,694 89
1810	40,757	1,080	13	191½	5,703	- -	318,238	568	5,374	7,915 85
1811	118,222	3,768	27	200	6,810	6,000	925,075	1,300	16,550	22,542 89
1812	55,829	3,143	6	360	1,694	7,320	515,526	613	9,214	11,471 37
1813	55,902	3,464	11	252	1,899	6,119	423,340	623	7,916	11,816 22
1814	38,769	2,684	18	361	676	5,314	311,094	596	5,987	9,109 82
1815	47,183	4,616	9	314	2,075	5,211	489,498	613	6,354	9,789 57
1816	35,918	1,774	29	419	9,292	6,371	357,661	550	6,152	7,501 52
1817	57,662	1,385	10	335	4,094	14,000	787,994	856	8,197	13,948 23
1818	58,226	3,126½	2	428¾	8,750	15,124	681,925	746	9,778	10,332 26
1819	66,542½	1,479	- -	278½	9,988	15,521	565,011	775	7,550	12,514 04
1820	75,272	1,215	14	227½	16,588	12,230	420,818	917	16,596	13,107 31¼
1821	67,557	1,391	10	115	11,515	10,027	318,810	760	11,400	12,490 61
1822	50,138	2,416½	31½	300	17,245	6,508	369,523	782	11,730	11,103 50½
1823	28,542½	1,331	39	445½	12,125	3,726	246,465	414	6,210	6,238 85
1824	47,599	2,738	55	564	13,512	3,562	331,641	662	9,546	9,857 13½
Total	1,211,903	42,456½	520½	6,485¼	$ 240,788	$ 187,886	$9,935,564	15,000	179,554	$238,117 66¼

NOTE *to the preceding page.*—The apparent small amount of tolls heretofore received, and the variation of receipts of different years, are to be accounted for by the circumstance, that the present works, and attempted improvements in the bed of the river, can be only periodically used for navigation, when the prevalence of rains, or the melting of the winter snows, produce a very considerable rise in the waters of the Potomac.

Extracts from the Act of the State of Maryland, for the Promotion of Internal Improvement; passed March 8, 1826.

SEC. 19. *And be it enacted,* That the Treasurer of the Western Shore be, and he is hereby, authorized and required, for and on behalf of the State, to subscribe to the Chesapeake and Ohio Canal Company for stock to the whole amount of the stock of the Potomac Company owned by the State, and of the debt due to the State by the said Potomac Company, and to pay for the same in the certificates of the stock of the Potomac Company, and in the evidences of the debt due to the State, certified in the manner specified in the charter of the said Chesapeake and Ohio Canal Company; and also to subscribe for five thousand shares of the stock of the said company, payable agreeably to the terms of the charter in the legal currency of the United States.

SEC. 20. *And be it enacted,* That the Treasurer of the Western Shore be, and he is hereby, instructed and required, in like manner, to subscribe for five thousand shares in the Maryland Canal Company hereby incorporated.

SEC. 21. *And be it enacted,* That the sum of two hundred thousand dollars shall be, and the same is hereby, appropriated, or such part thereof as may be necessary to drain, embank, and render dry and arable, the low lands on the margins of such rivers and creeks of the Eastern shore of this State as the Board of Public Works may think proper and recommend, and to complete and carry into effect such plans for opening and improving the navigation of the Pokomoke, Manokin, Wicomico, Great Choptank, Chester, Elk, and North East Rivers, as the Board of Public Works may devise, recommend, and contract for on behalf of the State of Maryland: *Provided,* That, before any part of the aforesaid subscriptions, except so much as is payable in the stock and debt of the Potomac Company, shall be made, or any part of the sum herein appropriated to execute the improvements contemplated by this act to be made, on the low lands situated on the margins of the aforesaid rivers and creeks, or to execute the improvements of the Pokomoke, Manokin, Wicomico, Great Choptank, Chester, Elk, and North East Rivers be expended, the Congress of the United States shall, by law, authorize a subscription for not less than ten thousand shares of the capital stock of the eastern section of the Chesapeake and Ohio Canal, and shall enact a law expressly securing to the State of Maryland, and to any company incor-

porated, or hereafter to be incorporated by the said State, the right to take and continue a canal from any point of the Chesapeake and Ohio Canal through the Territory of Columbia, or any part thereof to the said State. in any direction it may deem proper, upon the same terms and conditions, and with all the rights, privileges, and powers of every kind whatsoever granted to the Chesapeake and Ohio Canal Company by the act of incorporation, and deciding agreeably to the act of Congress passed at December session, eighteen hundred and twenty-four, that the canal, as located by the Board of Public Works under the authority of this act, may be cut without impeding or injuring the navigation of the Chesapeake and Ohio Canal. *And provided also,* That the Board of Public Works shall previously ascertain and certify to the Executive the practicability of connecting, by the canal described in this act, the Chesapeake and Ohio Canal with the Patapsco River at the city of Baltimore; and if the said Board of Public Works shall adopt for the said canal a line wholly within the State of Maryland, then the act of Congress last mentioned in the foregoing proviso, shall not be necessary to authorize the subscriptions and expenditures aforesaid: *And provided also,* That the Executive shall previously be satisfied that the residue of the sum of money estimated by the United States Board of Engineers to be adequate to the completion of the eastern section of the Chesapeake and Ohio Canal, after deducting the amount of the subscriptions of the State of Maryland and of the United States herein provided to be made, hath been actually subscribed by bona fide and competent subscribers.

ACT OF THE STATE OF PENNSYLVANIA.

An Act incorporating the Chesapeake and Ohio Canal Company.

SECTION 1. *Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same,* That the full and entire assent of this Commonwealth be, and the same is hereby, given to all and each of the provisions, mentioned and contained in an act of the legislature of the State of Virginia, passed the twenty-seventh day of January, one thousand eight hundred and twenty-four, entitled "An act incorporating the Chesapeake and Ohio Canal Company," so far as the same are or may be applicable to this Commonwealth; and the said act of the State of Virginia, is hereby adopted, ratified, and confirmed, and enacted into a law of this Commonwealth, and all and each of the provisions, conditions, and restrictions thereof, as fully and effectually, as if the same were enacted, paragraph by paragraph, and section by section, so far as the same can apply to this Commonwealth; always, nevertheless, subject to the exceptions, provisions, and restrictions, hereinafter mentioned; and the said act shall hereafter be in full force and effect, wherever the same is applicable, as well within, as without this Commonwealth, as an act incorporating the Chesa-

peake and Ohio Canal Company, for all and every of the objects and purposes therein set forth and provided for, according to the true intent and meaning of the said act of the State of Virginia; an exemplification whereof, shall be annexed to this act, and be published in the same manner as the laws usually are published; and the Governor shall likewise cause an exemplified copy of the said act of Virginia to be deposited in the secretary's office of this Commonwealth, and shall also transmit an attested copy of this act to the President of the United States, and one copy thereof to the Governor of Virginia, and one copy thereof to the Governor of Maryland.

SEC. 2. *And be it further enacted by the authority aforesaid*, That this act shall have no effect, unless, within three years from and after the passage hereof, the State of Maryland shall pass a law authorizing the State of Pennsylvania, or any company which may be for that purpose incorporated by the State of Pennsylvania, to take and continue a lateral canal or canals, or a rail way, from any point or points within the territory of Pennsylvania, to, and connect with the Chesapeake and Ohio Canal, within the territory of the said State of Maryland, upon the same terms and conditions, and with all the rights, privileges, and powers, of every kind whatsoever, that the Chesapeake and Ohio Canal Company may have to make the said Chesapeake and Ohio Canal, and unless the said Chesapeake and Ohio Canal Company shall assent to and accept the said law of the State of Maryland, within one year after it shall have been enacted: *Provided*, That, should the said Chesapeake and Ohio Canal be located on the south side of the Potomac, at any point or points below the town of Hancock, then the assent of Virginia, and the said Chesapeake and Ohio Canal Company shall also be obtained in like manner, before this act goes into operation, except so far as it requires the assent of Maryland to the right to make a railway through the territory of that State.

SEC. 3. *And be it further enacted by the authority aforesaid*, That, as a condition on which this act shall pass, no greater tolls shall be charged or paid on goods, commodities, and produce, entering and transported on the said Chesapeake and Ohio Canal, from such lateral canals, than are charged and paid on other goods, commodities, and produce, of the same kind, transported on the said Chesapeake and Ohio Canal: *And provided further*, That the aforesaid Chesapeake and Ohio Canal Company shall extend the Chesapeake and Ohio Canal to, and terminate the same at, the city of Pittsburg.

SEC. 4. *And be it further enacted by the authority aforesaid*, That the said Chesapeake and Ohio Canal Company shall have full power and authority to alter and change the route of the western section of the said canal, so that the same may commence at the town of Cumberland, situated near the junction of Wills creeks, with the north branch of the Potomac, and be continued from thence by the valley of Wills creek, and Casselmen's river, to the Youghiogeny, and from thence to the city of Pittsburg: *Provided*, That the United States'

Board of Internal Improvement, or a majority thereof, should deem and report that route to be the best.

Sec. 5. *And be it further enacted by the authority aforesaid,* That should the United States of America subscribe to the stock of the said Chesapeake and Ohio Canal Company, the said company shall, within six months after receiving the sum subscribed, commence the western section of said canal, at such point or points as may be deemed most advantageous to the interests of the said company; and it shall be their duty to apportion at least one half of the subscription of the United States to the western section of the said canal. And whatever amount of stock may be subscribed by the citizens of Pennsylvania, shall be expended wholly on the western section, unless authority is given to the said company, by the Pennsylvania subscribers, to expend their subscriptions differently; and, in case of failure of the said company to comply with the provisions herein set forth, this act shall cease to have any force or effect, whatever

Sec. 6. *And be it further enacted by the authority aforesaid,* That, if the net annual dividend of said company shall, for any two years in succession, exceed the amount of fifteen per cent. such excess shall be equally applied by the president and directors, to the accommodation of the inhabitants of the shores of the Youghiogeny and Monongahela rivers, and of the country drained by the tributary streams thereof, now navigable, or which may hereafter become so, in the same manner, in proportion to the distance, as is directed for the accommodation of the inhabitants of the shores of the Potomac, and its tributary streams, by the eleventh section of an act of the State of Virginia, entitled "An act incorporating the Ohio and Chesapeake Canal Company," passed the twenty-seventh day of January, one thousand eight hundred and twenty-four.

Sec. 7. *And be it further enacted by the authority aforesaid,* That it shall and may be lawful for the said Chesapeake and Ohio Canal Company, at any place within this Commonwealth, on the route of the said canal, to sell or lease the use of the water contained therein, or in any embankment, dyke, pond, or other improvement connected therewith, to any individual or individuals, or private company or companies, for that purpose incorporated by the State of Pennsylvania, for mills, or any other water works, or for irrigating any lands, or for supplying bleach grounds, tan pits, or brick yards, and the profits or rents resulting therefrom, to take and receive to, and for the use and benefit of, the said corporation, in addition to the tolls and profits allowed to be taken by the act of Virginia: *Provided,* That the navigation of the said canal be not thereby impeded or obstructed: *And, provided further,* That the said Chesapeake and Ohio Canal Company shall not, at any time, be directly or indirectly engaged or concerned in any banking, merchandising, milling, or the erecting of mills, manufacturing or mining, or in any other business whatsoever, except such as may be necessary and proper for the construction of such canal and appurtenances, and the performance of the several functions of a canal company.

SEC. 8. *And be it further enacted by the authority aforesaid,* That, as a further condition on which the assent of this State is given to the Virginia act, aforesaid, that, so far as regards the territory of Pennsylvana, whenever the said canal shall cross any public or private laid out road or highway, or shall divide the ground of any person or persons, so as to require a ford or bridge to cross the same, the jury, who shall inquire of the damages to be sustained, in manner directed by the fifteenth section of the Virginia act, shall find and ascertain whether a passage across the same shall be admitted or maintained by a ford or bridge; and on such finding, the said Ohio and Chesapeake Canal Company shall cause a ford to be rendered practicable, or a bridge fit for the passage of carts and wagons to be built, and forever hereafter maintained and kept in repair, at all and every places so ascertained by the said jury, at the costs and charges of the said company; but nothing herein contained shall prevent any person from erecting and keeping in repair, any foot or other bridge, across the said canal, at his own expense, when the same shall pass through his ground: *Provided,* The same shall be of such height above the water, as shall be usual in the bridges erected by the company: *And, provided also,* That such foot or other bridges, so to be erected by the owners of such lands, shall not interfere with any of the locks, buildings, or other works of the company, or with the navigation of the said canal.

SEC. 9. *And be it further enacted by the authority aforesaid,* That the assent of the legislature of this Commonwealth, to the said act of the legislature of Virginia, is given and granted, upon the further express conditions, that any mesne process which may be issued against the said company, may be served on any toll gatherer, director, or other officer, of the company; and such service shall be held good, valid, and effectual, as a service of such process upon the said Ohio and Chesapeake Canal Company; and that said company shall annually report to the legislature of Pennsylvania the progress they may make in constructing the said canal; and also an annual abstract of their accounts. certified by the oath of the president of the said company, shewing the amount of capital stock actually paid in. and the sums deposited with the treasurer for contingent and current expenses, and the profits which may have accrued, and the dividends made or declared during the preceding year.

19th CONGRESS, 1st SESSION. [Doc. No. 127.] Ho. of Reps.

WASHINGTON CANAL COMPANY.

ANNUAL REPORT

OF

THE PRESIDENT AND DIRECTORS

OF THE

Washington Canal Company.

MARCH 10, 1826.

Read, and laid upon the table.

WASHINGTON:
PRINTED BY GALES & SEATON,
1826.

To the Senate and House of Representatives of the United States of America.

The President and Directors of the Washington Canal Company, in obedience to a requisition of their charter, lay before the Congress of the United States the following statement of their receipts and expenditures for the year ending on the 31st day of December last, to wit:

Balance in the hands of the Treasurer, per last report,		38 62½
Amount receive for wharfage, wharf rents, &c. -		1,105 90¼
		1,144 56¾
Amount paid dividends on stock, -	693 00	
Amount expended in improving the Canal, the payment of discounts on moneys borrowed, and debts to individuals, &c.	499 68½	
		1,192 68½
Amount due the Treasurer on the 1st January, 1826,		$48 11¾

Respectfully submitted,

FRED. MAY, *P. W. C. Co.*

Washington City, March 10, 1826.

19th CONGRESS, 1st SESSION. [Rep. No. 228.] Ho. of Reps.

CHESAPEAKE AND OHIO CANAL.

MAY 22, 1826.

Mr. STEWART, from the Committee on Roads and Canals, to which the subject had been referred, made the following

REPORT:

The Committee on Roads and Canals, to whom was referred the joint memorial of the Central Committee and the Commissioners appointed by Virginia, Maryland, and the United States, to open books for the subscription of stock in the Chesapeake and Ohio Canal, with sundry petitions from the citizens of Pennsylvania and Maryland on the same subject, respectfully report:

That they have given the important subject referred to them all the consideration which the short time allowed at so late a period of the session would permit.

In presenting the subject to the consideration of the House, the committee propose, in the first place, to take a brief view of the early history of this measure, its origin and progress up to the present time; then to state some of the most important facts and results disclosed by the recent surveys, together with an estimate of the probable expense of the work, and the ways and means for its accomplishment, and finally present some of the benefits and advantages which it is believed will compensate the nation for the cost of its construction.

The committee have obtained possession of a variety of letters, reports, maps, and papers, connected with this subject, in the hand writing of General Washington, extracts of which are annexed to this report. From these papers it appears that the importance of improving the navigation of the Potomac river, which affords the nearest and most practicable connexion with the Western Waters, attracted the attention of the Colonial Government of Virginia whilst yet a province of Great Britain. Among the manuscripts referred to, the committee find a report in the hand writing of General Washington, dated in 1754, stating all the difficulties and obstructions to be overcome in rendering the Potomac navigable, and he actually succeeded, says his biographer, Marshall, in getting an act passed by the Colonial Government "*to open the Potomac so as to make it navigable from tide water*

to Wills' creek, and the business was in a train which promised success when the Revolutionary war diverted the attention of its patrons, and of all *America from internal improvements* to the great objects of liberty and independence. As that war approached its termination, subjects which, for a time, had yielded their pretensions to consideration, reclaimed that place to which their real magnitude entitled them; and the internal navigation again attracted the attention of the wise and thinking part of society. Accustomed to contemplate America as his country, and to consider with solicitude the interests of the whole, Washington now took a more enlarged view of the advantages to be derived from opening both the Eastern and the Western Waters, and for this, as well as for other purposes, after peace had been proclaimed, he traversed the Western parts of New England and New York." And in a letter to the Marquis of Chastelleux, he says, "I have lately made a tour through the lakes George and Champlain, as far as Crown Point; then returning to Schenectady, I proceeded up the Mohawk river to Fort Schuyler; crossed over the Wood creek which empties into the Oneida lake, and affords the water communication with Ontario. I then traversed the country to the head of the Eastern branch of the Susquehannah, and viewed the lake Otswego, and the portage between that lake and the Mohawk river, at Conajoharie. Prompted by these actual observations, I could not help taking a more contemplative and extensive view of the vast inland navigation of these United States, and could not but be struck with the immense diffusion and importance of it; and with the goodness of that Providence which has dealt his favors to us with so profuse a hand. Would to God we may have wisdom enough to improve them! I shall not rest contented until I have explored the Western country, and traversed those lines (or great part of them) which have given bounds to a new empire."

In the Fall of the same year it appears that General Washington, being so deeply impressed with the importance of uniting the Eastern and Western Waters, and devoting all his time and attention to it, actually explored the route of the Chesapeake and Ohio Canal as far as Pittsburg. When he returned he made out a detailed and accurate report of the distances, the advantages and disadvantages of the several routes, examined by him, and on comparing them he expressed, unequivocally, his opinion that the Potomac and Ohio afforded the nearest and most practicable route for the accomplishment of his favorite plan of approximating the Eastern and Western Waters;* and

* *Extract from the manuscript calculation of General Washington.*

Distances from Detroit to the several Atlantic seaports:

From Detroit, by the route through Fort Pitt and Fort Cumberland,

To Alexandria, (or Washington City,) - -	607 miles.
" Richmond, - - - - -	840
" Philadelphia, - - - - -	745
" Albany, - - - - - -	943
" New York, - - - - -	1103

At present from the head of steamboat navigation, on the Ohio, at Pittsburg, the

what is a most remarkable fact, he at that early day predicted the accomplishment of the New York Canal, and that the trade of the West would soon be sufficient to supply with business not only the Potomac and Ohio. and New York Canals, but also one through the Susquehannah, to Lake Erie, which he thought would also be found practicable. But a circumstance still more remarkable, and one which shows in a most striking point of view the character of this great and extraordinary man is, that among his manuscript papers endorsed in his own hand writing, the committee have found a map exhibiting the whole route of the *Chesapeake and Ohio Canal*, indicating the *practicable point of connexion*, which appears to be precisely the same recommended by the United States' Board of Engineers in their report made to Congress at the last session!! This map also exhibits the route of a road or portage to connect the Eastern and Western Waters, commencing at Cumberland and terminating at the Youghiogeny, precisely at the point where the present Cumberland road strikes that river, and without any material deviation in the intermediate space. Having made these surveys and reports, General Washington succeeded in getting a company incorporated by the concurrent acts of Virginia and Maryland, to improve this navigation, of which company he consented, at the pressing solicitation of Mr. Jefferson, Mr. Madison, and other distinguished individuals who co-operated with him, to accept the Presidency. In his letters to the Governors of Virginia and Maryland, to the members of Congress, and others, he labored incessantly to impress upon them the immense importance of opening a cheap and easy communication with the Western country by means of internal improvements. "He suggested," says Marshall, "the appointment of Commissioners of integrity and abilities, exempt from the suspicion of prejudice, whose duty it should be, after an accurate examination of the Potomac, to search out the nearest and best portage between it and the streams capable of improvement, which run into the Ohio. Those streams were to be accurately surveyed, the impediments to their navigation ascertained, and their relative advantages examined. The navigable waters West of the Ohio, towards the great lakes, were also to be traced to their sources, and those which empty into the lakes to be followed to their mouths." "These things being done." says Marshall, "and an accurate map of the whole presented to the public, he was persuaded that reason would dictate what was right and proper." "For the execution of this latter part of his plan *he had also much reliance on* CONGRESS; and in addition to the

comparative distances by the New York and Chesapeake and Ohio Canals, stand thus—

To New York, by French Creek and Lake Erie, - -	784	miles.
From Pittsburg to Washington, by the Chesapeake and Ohio Canal,	346	
Difference -	438	in favor of the Chesapeake and Ohio Canal.

And General Washington's views are confirmed by Mr. Gallatin, who, in his report on internal improvements, says "the Potomac furnishes the shortest communication from tide water to the nearest Western river."

general advantages to be drawn from the measure, he labored, in his letters to the members of that body, to establish the opinion, that the surveys he recommended would add to the revenue, by enhancing the value of the lands offered for sale." "Nature," he said, "had made such an ample display of her bounties in those regions, that the more the country was explored, the more it would rise in estimation." The assent and co-operation of Maryland being indispensable to the improvement of the Potomac, he was equally earnest in his endeavors to impress a conviction of its superior advantages on influential individuals of that State. In doing so he detailed *the measures which would unquestionably be adopted by* NEW YORK AND PENNSYLVANIA FOR ACQUIRING THE MONOPOLY OF THE WESTERN COMMERCE, *and the difficulty which would be found in diverting it from the channel it had once taken.* "I am not," he added, "for *discouraging the exertions of any State to draw the commerce of the Western country to its sea ports. The more communications we open to it, the closer we bind that rising World,* (for indeed it may be so called,) *to our interests, and the greater strength shall we acquire by it. Those to whom nature affords the best communication, will,* IF THEY ARE WISE, *enjoy the greatest share of the trade. All I would be understood to mean, therefore, is.* THAT THE GIFTS OF PROVIDENCE MAY NOT BE NEGLECTED."

"*But the light in which this subject would be viewed with most inte-*
"*rest, and which gave to it most importance, was its political influence*
"*on the Union. Nor need I press, (says he,) the necessity of applying*
"*the cement of interest, to bind all parts of the Union together, by indis-*
"*soluble bonds; especially of binding that part of it which lies immedi-*
"*ately West of us, to the Middle States.*"

Thus, it clearly appears that General Washington entertained no doubts of the power of the National Government, to engage in a general system of internal improvement, even before the adoption of the present Constitution, when its powers, all admit, were much more limited than they are at present, and for the extension and enlargement of which, the present Constitution was formed and adopted by the States.

Delighting to dwell on these patriotic, clearsighted, and prophetic views of the Father of his Country, on the subject of internal improvement, and believing that this gratification will be common to all, especially, at a time when the subject is attracting so much of the public attention, the committee will venture to present some additional views and arguments urged by Washington, in favor of the *Chesapeake and Ohio Canal.*

In a letter addressed to a *member of Congress,* when speaking of the importance of this subject, and the dangers of a separation of the Eastern and Western States, unless measures were adopted to prevent it by facilitating intercourse between them, which he pronounced to be the "the best if not the only cement to bind them together" he adds, "this is a matter which, though it does not come before *Congress* WHOLLY, is in my opinion of great political importance, and ought to be attended to in time." And, in speaking of the danger of severa-

tion, he says, "It may be asked how are we to prevent this? Happily for us the way is plain. Our immediate interests, as well as remote political advantages point to it; whilst a combination of circumstances render the present time more favorable than any other to accomplish it. Extend the inland navigation of the Eastern waters;—communicate them as near as possible, with those which run westward;—open these to the Ohio;—open, also, such as extend from the Ohio towards Lake Erie; and we shall not only draw the produce of the Western settlers, but the peltry and fur trade of the lakes, also, to our ports; thus adding an immense increase to our exports, and binding those people to us by a chain which never can be broken."

"His letter to the Governor was communicated to the Assembly of Virginia, and the internal improvements it recommended were zealously advocated by the wisest and most influential members of that body; while the subject remained undecided, General Washington, accompanied by the Marquis La Fayette, who had crossed the Atlantic, and had devoted a part of his time to the delights of an enthusiastic friendship, paid a visit to the Capital of the State. Never was reception more cordial, or more demonstrative of respect and affection, than was given to these beloved personages. But amidst the display of addresses and of entertainments which were produced by the occasion, the great business of promoting the internal improvements then in contemplation, was not forgotten; and the ardor of the moment was seized to conquer those objections to the plan, which yet lingered in the bosoms of those who could perceive in it no future advantages to compensate for the present expense."

"An exact conformity between the acts of Virginia and Maryland, being indispensable to the improvement of the Potomac, the friends of the measure deemed it advisable to avail themselves of the same influence with the latter State, which had been successfully employed with the former; and a resolution was passed, soon after the return of General Washington to Mount Vernon, requesting him* to attend the Legislature of Maryland, in order to agree on a bill which might receive the sanction of both States. This agreement being happily completed, the bills were enacted, under which, works, capable of being rendered the most extensively beneficial of any thing yet attempted in the United States, have been nearly accomplished.

"These acts were succeeded by one, which conveys the liberal wishes of the legislature, with a delicacy scarcely less honorable to its framers, than to him who was its object. The Treasurer had been instructed to subscribe in behalf of the State, for a specified number of shares in each company. Just at the close of the Session, when no refusal of their offer could be communicated to them, a bill was suddenly brought in, which received the unanimous assent of both Houses, authorizing the Treasurer to subscribe, for the benefit of General Washington, the same number of shares in each company as were to be taken for the State. To the enacting clause of this bill was prefixed

* "General Gates was associated with him in the mission."

a preamble,† in which its greatest value consisted. With simple elegance, it manifested to the world, that in seizing this occasion, to make a donation, which would in some degree testify their sense of the merits of their most favored and illustrious citizen, the donors would themselves be the obliged. However delightful might be the sensations produced by this delicate and flattering testimony of the affection of his fellow citizens, it was not without its embarrassments. From his early resolution to receive no pecuniary compensation for his services, he could not be persuaded to depart; and yet this mark of the gratitude and attachment of his country could not easily be rejected, without furnishing occasion for sentiments he was unwilling to excite. To the friend who conveyed to him the first intelligence of this bill, his difficulties were thus expressed."

"It is not easy for me to decide, by which my mind was most affected, upon the receipt of your letter of the sixth instant, surprise or gratitude. Both were greater than I had words to express.

"The attention and good wishes which the Assembly has evinced, by their act for vesting in me one hundred and fifty shares in the navigation of the rivers Potomac and James, is more than mere compliment. There is an unequivocal and substantial meaning annexed. But, believe me, sir, no circumstance has happened since I left the walks of public life which has so much embarrassed me. On the one hand, I consider this act, as I have already observed, as a noble and unequivocal proof of the good opinion, the affection, and disposition of my country to serve me, and I should be hurt, if, by declining the acceptance of it, my refusal should be construed into disrespect, or the smallest slight upon the generous intention of the Legislature; or that an ostentatious display of disinterestedness, or public virtue, was the source of refusal.

"On the other hand, it is really my wish to have my mind, and my actions, which are the result of reflection, as free and independent as the air, that I may be more at liberty (in things which my opportunities and experience have brought me to the knowledge of,) to express my sentiments, and if necessary, to suggest what may occur to me, under the fullest conviction that although my judgment may be arraigned, there will be no suspicion that sinister motives had the smallest influence in the suggestion. Not content then with the bare consciousness of my having in all this navigation business, acted upon the clearest conviction of the political importance of the measure, I would wish that every individual who may hear that it was a favorite plan of mine, may know, also, that I had no other motive for promoting it, than the

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† "It is in these words: 'Whereas it is the desire of the Representatives of this Commonwealth to embrace every suitable occasion of testifying their sense of the unexampled merits of George Washington, Esquire, towards his country; and it is their wish, in particular, that those great works for its improvement, which, both as springing from the liberty which he has been so instrumental in establishing, and as encouraged by his patronage, will be durable monuments of his glory, may be made monuments also of the gratitude of his country: *Be it enacted, &c.*'"

advantage of which I conceived it would be productive to the Union at large, and to this State in particular, by cementing the Eastern and Western Territory together, at the same time that it will give vigor and increase to our commerce, and be a convenience to our citizens."

On the 22d of December, in the same year, 1784, General Washington presided at Annapolis, at a Convention of Delegates, consisting of the most distinguished patriots of the Revolution, from Virginia and Maryland, at which it was resolved, among other things, "That it is the opinion of this conference that the removing the obstructions in the Potomac river, and making it navigable, will increase the commerce of Virginia and Maryland, *and greatly promote the interest of the United States*, by forming a free and easy communication and connection with the people settled on the Western waters, already considerable in numbers and rapidly increasing. It will afford them proof of our disposition to connect ourselves with them by the strongest bands of friendship and mutual interest."

In another letter, addressed to a member of Congress on this subject in 1784, General Washington uses this emphatic language: "For my own part I wish sincerely every door to that country, (the West,) may be set wide open, and the commercial intercourse with it rendered as free and easy as possible. This, in my opinion, is the *best*, if not the *only cement*, that can bind these People to us for any length of time; and we shall be deficient in foresight and wisdom if we neglect the means of effecting it. Our interest" he says "is so much in unison with this measure, that nothing short of that ill-timed and misapplied parsimony and contracted way of thinking, which intermingles so much in our public councils, can counteract it."

If the policy which opposed this measure, more that forty years ago, was justly pronounced by Washington *unwise, ill-timed, contracted*, and *illiberal*, what would he say of it now? Since then, a new world, as if by magic, has sprung up in the West; the wilderness has yielded to the hand of industry; ships have taken the place of the Indian canoe; and splendid cities and towns, and cultivated fields, have risen and spread themselves over the ruins of savage huts. Then the means of the country were limited; the nation was in debt, and exhausted by the Revolutionary conflict which had just terminated. If *then* the policy that opposed this measure was justly considered "contracted and illiberal" what must be said of it *now*, when the means and resourses of the country are ample, and when the inducements to this measure, both in a commercial and political point of view, have so greatly increased with the increasing growth, population, and resources of the Western States, and as they increase in *weight*, so it is the part of a wise policy to increase the number and the strength of the ties which bind them to the East.

But to return to the narrative. It appears from an examination of the proceedings of the Potomac Company, incorporated by the concurrent acts of Virginia and Maryland, in 1784, that they went on to expend in the prosecution of the improvement of the natural bed of the river, until they expended $311,555, the amount of their subscribed

stock, twenty years tolls, and the further sum of $ 174,000, borrowed by the Company of the State of Maryland, banks, and individuals, without having accomplished the object, which is now admitted, on all hands, can be obtained, only by an independent and continuous canal, placed above the influence of tides or freshets. For the accomplishment of such a canal, the States of Virginia and Maryland, by concurrent acts of legislation, have recently incorporated a company; in these acts, the Congress of the United States, on the third of March, 1825, and the State of Pennsylvania, on the 7th February, 1826, passed acts of concurrence; all of which have received the approbation of the original Potomac Company, and nine commissioners have been accordingly appointed, three by the President of the United States, and three by each of the States of Virginia and Maryland, to open books for the subscription of stock for the completion of the first section, as far as the great coal mines near Cumberland; and these commissioners are now waiting the final report and estimates of the Board of Internal Improvement, to enable them to enter on the discharge of the duties of their appointment.

The final report and estimates on this subject have not yet been made. The report of the Board of Internal Improvement, made during the last session, establishes, however, the important fact as to the practicability of the project; and while on this subject, the committee beg leave to refer to the following facts and results, disclosed by the report drawn up by J. L. Sullivan, Esq. a member of the Board, as illustrative to the whole. Speaking of the supply of water on the Deep Creek route, it is stated that "this quantity appears to be treble that required, nor have we included those reservoirs which might be formed on Deep Creek and the Glades, nor that of which the Pine swamp West of the Youghiogeny, may be capable, nor one which might be formed by a dam above the Great Falls, allowing for sixty days drought, which has never occurred, and large locks in constant operation."

"The obstacles," says the report, "to a communication by the Potomac route with the Western States, lessens, to a point, when compared with the magnitude of the objects, whether in a commercial or political relation to the prosperity of the country." It is also demonstrated, that "the canal can pass at the summit 3000 tons per day; which, at 200 days in the year, gives 600,000 tons. This, at 2 cts. per ton per mile," the distance being 326 miles, will give $ 3,900,000 per annum of tolls, the distance now being ascertained to be 346; the tolls, of course, would be 4,152,000. It is also stated in this report, that "The section of the country, which will be accommodated by this canal, comprehends one sixth of Virginia, one fourth of Pennsylvania, with the States of Ohio, Indiana, and Kentucky, containing eighty-five millions of acres, and at least one million six hundred thousand inhabitants. But not these only—all beyond them are interested in an ultimate system of internal communications, and all, too, on this side, since our internal prosperity is the support of our external commerce—our navigation, which cherishes our best means of preserving peace, by efficiency in war. The eight Western States contain two hundred and forty-eight millions of acres, and at least two million five hundred

thousand inhabitants. If the land may average five dollars an acre, its value is twelve hundred and forty millions of dollars. and to this may be superadded, the four territories, containing seven hundred and eighty-six millions of acres, much of which is already likewise valuable. How small a per centage on this value would amount to the cost of all the internal improvements! How certainly good communications must double that value!"

"Finally," it is said "reviewing the whole ground, the Allegany "mountains, stretching through the centre of the Union, so far from "being a *barrier* to the most economical form of communication, is, in "fact, to be rather considered the great *laboratory* of that *element* "(water) which is essential to this branch of the internal improve- "ments, in the contemplation of the General Government."

Since the report of the Board of Internal Improvement, before adverted to, further surveys have been made, resulting in the discovery of a *new summit level*, for the canal between the Casselman river and Will's creek, where an ample supply of water is said to exist, and to which, should it be found necessary, the whole of the supply of the Deep creek summit might be transferred by a feeder. This new summit is nearly 400 feet lower than that of Deep creek, and about 26 miles nearer, from Cumberland to the Youghiogeny. This very important saving of lockage and distance, on the most difficult and expensive section of the work, gives the Casselman route a decided preference. though it will require a tunnel of greater length than the other. Another strong argument in favor of this route is derived from the consideration that it approaches within a very short distance of the waters of the Juniatta, by which, in the opinion of an experienced engineer, who has examined the country, a connexion may be formed with the Chesapeake and Ohio canal, so as to obtain the great object of uniting Pittsburg and Philadelphia, by a continuous canal, without any material increase of distance, over the route proposed by the State of Pennsylvania, and at, perhaps, less than one-fourth of the expense, which would be incurred in constructing it upon either of the Pennsylvania routes. The distance by the Juniatta route, the shortest yet discovered from the mouth of the Juniatta to Pittsburgh, is stated by the Pennsylvania Commissioners, to be upwards of 267 miles, and on this route a portage of at least 28 miles will be unavoidable, overcoming in that short distance an ascent of 1,553 feet, (1,276 in five miles) and a descent of 1,000 feet by a succession of inclined planes. The Northern route, which is of very doubtful practicability, is from the mouth of Juniatta to Pittsburgh, 353 miles, the West branch route 365 miles, and the Clearfield route 394, while the whole distance, by the proposed route, connecting with the Chesapeake and Ohio canal, between the same points, it is believed, will not exceed 286 miles, as follows: from Pittsburgh, by the Chesapeake and Ohio canal, to the point of divergence, at the mouth of Little Will's creek, 132 miles; thence to Bedford, 24 miles; and thence to the mouth of the Juniatta, 130 miles; requiring for its accomplishment only 162 miles of canal, through an easy and cheap route, without having to encounter the difficulties and expense usually incurred in constructing tunnels, deep

cuttings, &c. This connexion is further recommended by the consideration that it will relieve the State of Pennsylvania from the immense cost of uniting the Eastern and Western waters at her sole expense, by bringing to her aid the united efforts and aid of the United States, Virginia, and Maryland; besides, by this route, a continuous water communication will be opened between Philadelphia and Pittsburgh, by the nearest, and perhaps the only practicable route, passing through three counties, Somerset, Bedford, and Fayette, with a population of 61,000 in 1820, while Cambria, Indiana, and Armstrong, on the Juniata route, had but 22,000 (these are the only counties not intersected by both routes)—the policy of Pennsylvania, therefore, cannot be doubtful.

PROBABLE COST.

It is a matter of regret that the Board of Internal Improvement have not been able, with every effort on their part, to have their report and estimate prepared in time to communicate to Congress during the present session, but the committee are assured it will be in readiness at the commencement of the next session, so as to enable Congress then to act understandingly on the subject. According to the plan of construction proposed by the Board, which is of the most magnificent and durable character, the cost will not, perhaps, fall short of twenty millions of dollars, to complete the canal from this city to Pittsburg, a distance, by the route selected, of about 346 miles, including tunnels, reservoirs, feeders, and every other possible expense—greatly below the cost, per mile, of the Delaware and Chesapeake Canal, to which the United States have subscribed a large amount of stock. Still, the committee are aware that the estimate will at first be calculated to alarm many of the friends of this measure, before they are made acquainted with the dimensions and durable character of the plan of construction,* or have compared this work with what has been accomplished by other Governments, when the inducements and the advantages were inconsiderable compared with this. Even *Spain* has encountered and overcome much greater difficulties than are presented by the Chesapeake and Ohio Canal, in the construction of the *Reynosa* Canal, "which ascends an elevation 3000 feet in the short space of three leagues, (1000 in less than a quarter of a league,)" more than the utmost elevation of the Alleghanies. One of the Roman Emperors, (Claudius,) it is said, employed 30,000 men for 12 years, in the construction of a single canal; and Holland, scarcely half as large as one of our States, has expended upwards of three hundred millions pounds sterling in the construction of canals alone—more than double the whole amount of the expenditures of this Government, in peace and war, since the establishment of the present Constitution; and these canals, it is well known, furnish the great source of the immense wealth and commerce of Holland, as well as every where else where they have been adopted.† In England, they have constructed

* See Appendix.

† These canals are generally six feet deep, and sixty wide, and yield, it is stated, at the rate of $2,250,000 for every forty miles of navigation!

twenty-two independent canals across the highlands or mountains which separate that country as the Alleghanies do this. These are but a few instances, to shew what has been accomplished in other countries, greatly our inferiors, (except England,) in every thing else; and shall we yield to them in the spirit of internal improvement, by retiring from this work, which, according to the most extravagant estimate, cannot amount to the revenue of a single year? And when was there a period in our history so auspicious to the commencement of the great work of internal improvements as the present? At peace with all the world; unconnected with Europe, and strangers to the storms which disturb her repose; unique in our situation; abundant in our resources; the freest Government on earth, and a country embracing in its wide dominion every variety of climate and soil; intersected every where with vast mountains and rivers and lakes, extending their arms from the East to the West and from the West to the East, imploring, as it were, the aid of industry and art, to unite them in the bonds of perpetual union; making them the fruitful sources of wealth, of intercourse, and harmony, to the countless millions that repose upon their borders; awakening, by their plastic touch, to new activity and life, every branch of industry, agriculture, manufactures, and commerce; opening, every where, new and abundant sources of wealth, which must otherwise forever remain dormant and unknown.

If internal improvements have adorned and enriched other countries, why shall they not ours? What country under Heaven presents such advantages, or such inducements? If the traveller in Europe be every where delighted on his journey by magnificent roads and splendid canals, shall he come here to be disappointed? Shall this proud Republic lag behind the monarchs of Europe in improving its own condition, in conferring benefits and blessings on its People? Or, should the time come (which God forbid!) when this happy Government, sharing the fate of former Republics, shall fall beneath the power of some successful Cæsar, shall it be permitted to the proud usurper, looking abroad over the desolated land, to ask, in triumph, the fallen friends of liberty, Where are the benefits left by your boasted Republic? Where the foot-steps of its power, or the monuments of its glory? Where the remains of any of the boasted blessings which it has conferred upon the People?

This, it is in our power to prevent; it is our duty to do so. We should not be deterred by the expense; we have the means, and they cannot be better employed. The large amount required for this work is not so much owing to its intrinsic difficulties, as to the magnificence and durable character of the plan proposed for its accomplishment. This will appear by a comparison with other estimates, made by experienced Engineers, for the first section, as far as the coal mines at Cumberland.

The first survey and estimate of this section was made by Thomas Moore, Esq. Chief Engineer of Virginia, who, according to the plan then proposed, estimated the cost from this city to Cumberland, at - - $1,114,300

The next estimate was made in 1822, by Messrs. Moses T. Hunter, Wm. T. T. Mason, Wm. Nailor, Athan. Fenwick, and Eli Williams, Esquires, Commissioners appointed for that purpose by the States of Virginia and Maryland, aided by Messrs. Moore and Briggs, as Engineers; they estimated the cost of this section at - - - - - $1,578,954

General Abner Lacock, late a Senator in Congress, aided by David Shriver, Esq. who had an intimate knowledge of the subject, (whose investigations and writings on the subject are hereto annexed,) formed an estimate, and offered, in connection with other responsible men, to undertake its construction, for - $2,500,000

Yet the cost of this section, according to the plan proposed by the United States' Engineers, will exceed eight millions of dollars. And when it is considered that this work is not intended for the present age merely, but is intended to last for ages to come, and give vent to the commerce between the Atlantic and Western States, when their population may have increased to tenfold, the plan will not perhaps be regarded as extravagant, and the more especially, when we also consider that this canal is intended to open a communication from the Chesapeake to New Orleans, almost equal in extent to a voyage across the Atlantic, and that, in performing this voyage, it will require nearly the same expense with a vessel of fifty as with one of an hundred tons; and to this consideration in favor of the plan proposed, the committee would add another, which should not be overlooked, that the quantity of water required to fill a lock to pass a boat of fifty tons, will not be materially increased to pass one of double the burthen.

GENERAL REMARKS.

Mr. Gallatin, in his report on the subject of a general system of internal improvement, made in obedience to a resolution of the Senate, in 1808, says "The early aid of the *Federal Government* is recommended by still more important considerations: the inconveniencies, complaints, and dangers, which may result from a vast extent of territory, can no otherwise be radically removed or prevented, than by opening speedy and easy communications through all its parts. Good roads and canals will shorten distances, facilitate commercial and personal intercourse, and unite by a still more intimate community of interest the most remote quarters of the United States. No other single operation within the power of Government, can more effectually tend to strengthen and perpetuate that union which secures external independence, domestic peace, and internal liberty."

The committee concurring in these views of that distinguished and enlightened statesman, rejoice in the contemplation of the period as not far distant, when, from the operation of causes, which are both active and powerful, must soon make it the interest and duty of this government to adopt a general system of internal improvements, hav-

ing for its object the construction of such roads and canals as may be "necessary and proper to carry into effect" *three* of the powers expressly conferred upon Congress by the constitution, viz:

1st. "The power to regulate commerce among the several States," to which belongs all commercial roads and canals.

2d. "The power to establish post offices and post roads," to which appertains all roads for the transportation of the mail; and

3. The power "to provide for the common defence," &c. which carries with it the right to construct such roads and canals, as may be "necessary and proper for the national defence."

The active and efficient causes, which, in the judgment of the committee, will soon lead to the adoption of this system, are,

1st. The speedy extinguishment of the national debt, which, according to the report of the Committee of Ways and Means, made during the present session, it appears that by the annual application of the surplus revenue, the whole of the redeemable portion of the national debt, (except the three per cents and bank stock,) may be discharged by the 1st day of July, 1829, leaving a surplus at the close of that year in the Treasury of $10,652,528 69, which, added to the estimated surplus of 1830, will give to that year a surplus beyond all the ordinary expenditures of $25,652,528 69, and an annual surplus thereafter, of fifteen millions of dollars, applicable to objects of internal improvements, in such manner as Congress may direct; and this result, it appears, will be produced without making any allowance for an increase of revenue from the increasing wealth and population, and of cource, increased consumption of the country, which is the sourse of revenue, or for any increase from the increased sale of the public lands; and also, without allowing for any diminution of expenditure from the inevitable reduction of the pension list, now amounting annually to near a million and a half of dollars, or for a diminished expenditure on the public building and fortifications, now nearly completed, or the expiration in 1827, of the act appropriating $500,000, annually, for the gradual increase of the navy.

2d. The next cause which will lead, in the judgment of the Committee, to a speedy adoption of a general system of internal improvements, is to be found in the great success which has every where attended their accomplishment, and the immense profits and advantages derived from them, wherever they have been adopted.

3d. Because the general sentiment of the country is decidedly in favor of this policy—a sentiment which is rapidly extending itself throughout the country, and prevails almost universally in the *young and growing States* of the Union, while the opposition to it is confined almost exclusively to those States, whose relative strength in the Union is either *declining* or stationary.

4th. Because internal improvement is the only object on which the surplus revenue of fifteen millions a year can be expended after the extinguishment of the redeemable portion of the national debt in 1829, as before stated.

5th. Because the duties from which the revenue is derived, are not

imposed for purposes of *revenue*, but for the protection of the national industry against foreign competition, and these cannot and ought not to be repealed.

6. Because the *Tariff, and Internal Improvement* constitute one "*American system*" of policy, and must stand or fall together, for should the enemies of the tariff succeed in defeating internal improvements, on which alone the surplus revenue derived from the tariff can be expended, the argument that there is no use for the revenue, will at once be urged by them in favor of the repeal of the duties. It is then alike the interest and the duty of the friends of the tariff, and internal improvements, to unite in sustaining and upholding this system of policy, by which the taxes imposed for purposes of protecting the *national industry*, will be employed in promoting *national improvements*, and the tolls and revenue derived from these, may be devoted to purposes of education, and mental improvement, thus making taxation a blessing instead of a burden to the country.

WAYS AND MEANS.

The Committee, believing that they have thus demonstrated the importance of this work, and that a general system of improvements will shortly be commenced by the General Government, beg leave to suggest some reasons why, in their judgment, it should meet with prompt and efficient aid, without waiting the total extinguishment of the national debt:—In commencing any great system of measures, it is the part of a wise and prudent policy to commence gradually and cautiously. One improvident and wasteful expenditure at first, may have the most injurious effects; by this means, also, we will elicit improvements in the various plans and modes of construction, over different elevations, surfaces, &c.; whereas, if we do nothing, until we have discharged the whole of the national debt in 1829, and then commence in 1830, with a surplus of twenty-five millions six hundred and fifty-two thousand five hundred and twenty-eight dollars and sixty-nine cents, according to the report of the Committee of Ways and Means, without skill, without experience, without improved plans, and without economy, producing a feverish and unwholesome circulation in the body politic, by throwing at once such vast sums into circulation, raising, by the great demand, the price of labor and provisions, so as not only to make the public works much more costly to the Government, but to crush manufactures by the operation and the influence of the same causes.

The Committee would therefore suggest, whether it were not better to apply annually, the existing sinking fund of ten millions of dollars per annum to the national debt, and employ the surplus of five millions, in promoting internal improvements, until the national debt is extinguished; or to adopt the plan recommended a few days ago, by the Committee of the Senate. By either plan, the final discharge of the debt will only be delayed a few years; and, in the mean time, according to the report of the Committee of Ways and Means, we shall have five

millions annually of a surplus, for purposes of national improvement. This policy would not only have the happy effect of equalizing the payments, by throwing forward the surplus debt of the three next years, beyond the means of the Treasury to discharge, and distribute it through the four succeding years, when the amount redeemable, will fall greatly within our means; besides, this arrangement will be advantageous and gratifying to the public creditors, who deprecate nothing more than the too rapid discharge of the debt due them by the Government. The result, according to the plan proposed by the Committee of the Senate, would be as follows, viz:

1st. Jan.	For Int. Imp.	Principal.	For National Debt. Interest.	Total.	
1827		$11.000,000 00	$4,091,727 29	$15,091.727 29	6 per Ct.
1828	$5,000,000 00	7,000,000 00	3,431,727 29	10,431.727 29	
1829	5,000,000 00	7,000,000 00	3,011 727 29	10,011,727 29	
1830	5.000 000 00	7,000,000 00	2,591,727 29	9,591,727 29	
1831	5,000.000 00	6,857,439 24 1,592,000 20	2,171,727 29	10,627,166 73	5 per Ct.
1832	10,000,000 00	3,200,000 00	1,680,680 94	4,880,680 94	
1833	10.000 000 00	3 500,000 00	1,520,680 94	5,020,680 94	
1834	10,000,000 00	3,500,000 00	1,345,680 94	4,845,680 94	
1835	10,000,000 00	1,000,000 00 3.039,866 83	1,170,680 94	5,209,866 83	4½ per Ct.
1836	10.000,000 00	4,000,000 00	983.886 94	4,983.886 94	
1837	10 000,000 00	4 000,000 00	803,886 94	4,803,886 94	
1838	9,666 734 48	5,000,000 00	623,886 94	5,623,886 94	
	$89,666.734 48	$67,689,306 27	$23,428,021 03	$91,117,327 30	

Thus discharging the whole of the national debt, (except thirteen and a quarter millions of 3 per cents. redeemable at the pleasure of the Government.) in 12 years, affording, in the mean time, eighty-nine millions six hundred and sixty-six thousand seven hundred and thirty-four dollars forty-eight cents, to objects of internal improvement. which, if vested as stock in roads and canals, yielding 5 per cent. per annum, (little more than half the receipts on the New York canal.) it would yield an annual revenue to the Treasury, of four million four hundred and eighty-three thousand three hundred and thirty-six dollars seventy-two cents, equal to half the ordinary expenditures of the Government, and which would add an equal amount to the annual surplus applicable to these objects. On thirty canals in England, the tolls averaged in 1812. 30 per cent per annum, and the stock had risen in value 600 per cent. per annum. The Loughborough canal yielded 170 per cent. per annum; and the stock, originally £100 per share, was worth £3,500.

It may not be improper here to remark, that the result, as stated in the foregoing table, is produced without counting on any increase of revenue from tolls and from the increase of our national wealth and population, or any diminution of expenditure from the extinction of the pension list, and the completion of the fortifications and other public works which will shortly be accomplished, now requiring several millions a year. The Committee, however, cannot concur in so much of the plan proposed by the Committee of the Senate as contemplates the

distribution of the surplus revenue among the States, without retaining any control over its application and expenditure: Congress certainly ought, at least, to retain the right of selecting the objects within the States on which their money should be expended. The proceeds of the tolls, however, might be divided among the States according to population, to be applied to purposes of State improvements. The Committee object especially to the plan proposed in the Senate, because it would put it out of the power of the Federal Government to discharge the duties which it owes to the nation by providing for the construction of such roads and canals as may be "necessary and proper" for the "regulation of commerce between the several States," "for the common defence," and for the transportation of the mail; which are severally enumerated in the constitution, among the powers and duties of the Federal Government, and which it is bound to execute and fulfil to the extent of its means. But if the whole surplus revenue be absolutely surrendered up to the States, the National Government can accomplish nothing, and of course, great *national* objects, such as the canal under consideration, will remain neglected. This canal is an *internal* concern of no State, yet it is calculated to unite and benefit all the States; the internal navigation which it opens from the Chesapeake to New Orleans will wash the shores of nearly half the States in the Union, and receive, in its course, the produce of several others whose rivers flow into the Potomac, Ohio, or Mississippi; yet it is *external* to all these States, (except Pennsylvania,) and of course, these individual States have neither the power, or perhaps disposition, to devote their means to it, when other objects, internal, and of course more interesting to them, claim a preference.

The Committee now beg leave briefly to present some of the most prominent advantages which the accomplishment of the Chesapeake and Ohio Canal promises to the United States, and which, in their judgment, will amply compensate for the cost of its construction; and

1st. *Its advantages in a political point of view.*—For their views on this branch of the subject, the Committee will merely refer to the arguments and views of General Washington, already quoted, and to the following extract from the Report of the Committee of Roads and Canals at the last session of Congress, in which they fully concur: when referring to the Chesapeake and Ohio Canal, the Committee say, "This object, regarded as the most important and national, was the "first to claim the attention of the Executive in carrying into ef-"fect the provisions of the law of the last session, to procure surveys, "&c.; and the able Board of Engineers, who have given the subject "a full and careful examination during the last Summer, have pro-"nounced it perfectly practicable, at an expense small, compared with "the magnitude and importance of the object. This work, whether "regarded in a military, commercial, or political point of view, is "equally important. Passing through the centre of the Republic, "from one extreme to the other, opening an internal communication "of more than 2,500 miles, affording at once a powerful bond of the "Union, with every commercial facility in time of peace; and in war,

"the most effectual means of national defence. Besides its immedi-
"ate connection with the Seat of the *National Government*; its cen-
"tral position; the great extent of inland navigation which it opens,
"touching in its course *eleven* States of the Union, and furnishing a
"vent for the produce of several others. The shortness of the canal
"by this route, connecting the Atlantic tides with the steam boat
"navigation of the West at Pittsburgh, being less than 350, and to
"Lake Erie, less than 450 miles.

"These considerations, together with the general and diffusive na-
"ture of the benefits to result from this work, offering great advan-
"tages to all the States, yet peculiar to none; as well as the magni-
"tude of the undertaking, point it out as a work peculiarly *national*
"in its character, and cannot fail to secure for it the prompt and effi-
"cient aid of the General Government."

2d. *Its Commercial Advantages.*—Some idea of the commercial advantages of this work may be formed, when the fact is stated, that the transportation of merchandise for the supply of the Western States to Pittsburgh in one year, has amounted to one and a half million of dollars, and that the amount carried to Wheeling and other towns on the Western waters, and wagoned on through Ohio, at dry seasons, must have exceeded this amount; most of those wagons had also return loads of agricultural produce, which, with the amount carried by farmers and others, would probably nearly equal the transportation Westward, and should it amount to only half, still it would appear that the country sustains a tax for transportation of four or five millions a year; whereas, if this merchandise and produce were waterborne on canals, the cost would be reduced to less than half a million. The difference in cost being estimated as 10 to 1, though the usual estimate has been as 20 to 1; besides, the construction of the canal (as in New York,) would more than double the quantity of trade and commerce; thus the whole cost of the canal would be saved to the country in a few years, yielding, at the same time, on the stock invested, a profit of 6 or 8 per cent. to the Government, more than the amount of interest accruing on the national debt, which the national creditors are anxious should not be paid, and also returning to the People a portion of the money paid by them into the Treasury, to promote and cherish industry, trade, commerce, and manufactures, and these profits and advantages, of course increasing with the increasing growth and population of the country.

3d. *Its Advantages to Agriculture.*—These consist not so much in the saving in the cost of transportation, as in the powerful stimulus it would afford to agricultural industry in the interior and the increased value it would give to agricultural produce, and of course to the general wealth of the country. The difficulties under which the interior at present labors for want of facilities of transportation to the proper markets, are indescribable. Immense districts of the finest land in the world lay waste and uncultivated, because the produce will not bear transportation unless converted into spirit to brutalize mankind; forests of the finest timber, which might be sources of wealth, but en-

cumber the ground; and often that which is in the greatest demand in one portion of our country, lies neglected and useless in another.

To illustrate the importance of this work to the interests of agriculture, the Committee beg leave to add one other statement. By the census taken in 1810, 16 years ago, it appears that there was manufactured in that year, in a few of the Western counties of Pennsylvania, 371,436 barrels of flour, and 38,722 of whiskey, making together, 410,158 barrels, amounting to 62,261 tons, which, transported on the canal, at 2 cents per ton per mile, would cost $430,846 12: but if it had been transported in wagons to Atlantic markets, at that time it would have cost upwards of five millions of dollars, and would at present cost more than $2,500,000; thus it appears that a saving of more than five millions of dollars might have been produced by the Chesapeake and Ohio Canal on the transportation to the Atlantic markets, of the flour and whiskey alone, manufactured in 1810, in a few counties in the Western part of Pennsylvania!! What then would be the saving on the infinite variety of agricultural, mineral, and manufactured products, not only of the Western part of Pennsylvania, but also of West Virginia, Kentucky, Ohio, Indiana, and, in short, all the interior and Western portions of the Union, bordering upon the Ohio and its tributary streams? to which might be added an equal saving on the back loading of merchandise, transported on the canal, for consumption in the West.

4th. *Its advantages as to Mines of Ore, Coal, and Quarries of Stone.*—The fact is too notorious to require repetition that the mountains and interior portions of our country, and especially the region through which the Chesapeake and Ohio Canal is located, abounds with inexhaustible mines of the richest ore, and the finest coal in the world, which lie hidden and useless in the bowels of the Earth, for want of the means of transportation, and which might be made sources of unbounded profit and accommodation, adding millions annually to the National resources, giving profitable employment to labor, stimulating industry, increasing general wealth, supplying our country with means alike necessary in peace and war, and for which we are now dependent on foreign countries, and annually paying them a heavy tribute. Millions are annually sent abroad to feed and employ foreign labor, manufacturing and agricultural, to the neglect and injury of our own, to procure what abounds in the utmost profusion at home buried and dormant in the bowels of the Earth, and requiring nothing but the plastic and vivifying influence of these facilities of transportation to spring at once into useful and prosperous activity, yielding not only an abundant domestic supply, but a surplus for exportation.

5th. *Its advantages in reference to Villages, Towns, Water Power, and Manufactures.*—These are objects not unworthy of consideration. The facility and inducements offered throughout the whole extent of this canal, for the building up of villages and towns, and erecting an almost infinite variety of mills, furnaces, forges, and other water works, thus creating, as if by magic, busy scenes of active industry,

hurrying commerce and prosperous trade, where shortly before was a howling wilderness and gloomy desert. This is no picture of fancy, but matter of fact, to which every one who has passed along the New York canal, can bear ample testimony. And who can for a moment doubt, that equal, if not greater results would be produced on the Chesapeake and Ohio canal, especially when they consider its decided superiority over that of New York, in the immense inland navigation which it connects and opens, touching in its extent from the Chesapeake to New Orleans nearly half the States in the Union, throwing into this common channel their surplus produce, and receiving through it their supplies of merchandise in return; to which may be added its superiority in reference to *climate*, central position, and the inexhaustible mountain supplies of coal, ore, and timber.

6th. *Its Military Advantages.*—In a country like ours, spreading over an immense continent, with ane xposed military frontier of at least four or five thousand miles, depending for its defence at all times not upon standing armies, but upon the militia, the citizen soldiers, dispersed throughout every portion of the Nation, the best and most efficient means of attack or defence will always be found in the facilities offered by good roads and canals, for the rapid concentration, and rapid movement of the physical forces wherever their presence may be required, whether to repel invasion from abroad, or quell insurrections at home.

Nothing can so effectually deter the spirit of foreign aggression, or nip domestic treason in the bud, as the existence every where of those facilities by which the whole force of the country can be at once concentrated and precipitated upon it, crushing it in embryo, before it can mature its plans or execute its designs. If proof were wanting to illustrate the advantages of roads and canals in time of war, the Committee would refer to the waste of blood and the waste of treasure during the late contest produced by the want of these facilities—flour in many instances on the Northern frontier, costing one hundred dollars per barrel, and a thousand dollars for the transportation of a single piece of cannon, which on account of the delay were useless, the enemy having accomplished his objects before they had arrived at the places where they were required for the public service. But the Committee cannot better express their views on this branch of the subject, than by adopting the language of the late Secretary of War, now Vice President of the United States, who, in his very able report to Congress in 1819, on the importance of roads and canals, in a military point of view, says:

"A judicious system of roads and canals, constructed for the convenience of commerce, and the transportation of the mail only, without any reference to military operations, is, itself, among the most efficient means for 'the more complete defence of the United States.' Without adverting to the fact, that the roads and canals, which such a system would require, are, with few exceptions, precisely those which would be required for the operations of war; such a system,

by consolidating our Union, increasing our wealth and fiscal capacity, would add greatly to our resources in war. It is in a state of war, when a nation is compelled to put all of its resources in men, money, skill, and devotion to country, into requisition, that its Government realizes, in its security, the beneficial effects from a People made prosperous and happy by a wise direction of its resources in peace. But I forbear to pursue this subject, though so interesting, and which, the farther it is pursued, will the more clearly establish the intimate connexion between the defence and safety of the country and its improvement and prosperity, as I do not conceive that it constitutes the immediate object of this report.

"There is no country to which a good system of military roads and canals is more indispensable than to the United States. As great as our military capacity is, when compared with the number of our People, yet, when considered in relation to the vast extent of our country, it is very small; and if so great an extent of territory renders it very difficult to conquer us, as has frequently been observed, it ought not to be forgotten, that it renders it no less difficult for the Government to afford protection to every portion of the community."

And after presenting a general system of roads and canals, including the Chesapeake and Ohio canal, now under consideration, he concludes by saying:

"Many of the roads and canals which have been suggested, are, no doubt, of the first importance to the commerce, the manufacture, the agriculture, and political prosperity of the country, but are not, for that reason, less useful or necessary for military purposes. It is, in fact, one of the great advantages of our country, enjoying so many others, that, whether we regard its internal improvements in relation to military, civil, or political purposes, very nearly the same system, in all its parts, is required. The road or canal can scarcely be designated, which is highly useful for military operations, which is not equally required for the industry or political prosperity of the community. If those roads or canals had been pointed out, which are necessary for military purposes only, the list would have been small, indeed. I have, therefore, presented all, without regarding the fact, that they might be employed for other uses, which, in the event of war, would be necessary to give economy, certainty, and success, to our military operations; and which, if they had been completed before the late war, would, by their saving in that single contest, in men, money, and reputation, have more than indemnified the country for the expense of their construction."

Its advantages to the Seat of Government.—The effect of constructing the Chesapeake and Ohio Canal could not fail to raise the City of Washington to the first rank among the commercial cities of the Union. With all the facilities for importation, it would stand several hundred miles in advance of all the Atlantic cities, in reference to the commerce and trade of the interior and the West. Such a great and obvious advantage could not fail to attract the merchants and capitalists of the country, who are always quick to see, and prompt to seize,

every occasion which promises a profitable investure of their funds; and the foreigners who visit the seat of the National Government, from which they generally form their ideas of the whole country, instead of finding a dull and dispersed town, presenting nothing to gratify or amuse, would find a splendid city, with all the embellishments, fascinations, and advantages, which ought to belong to the Capitol of this great nation. Besides, if mercenary motives could be permitted to influence on a subject of such national moment, even these would find ample gratification in the greatly enhanced value which it would give the public property belonging to the United States, in this city, consisting of upwards of 5,000 building lots, with a large quantity of other grounds, houses, and public property, estimated, in 1820, at $7,345,692, as well as in the diminished expense of living, produced by opening an easy communication with the finest markets in the world, and to the most abundant mines of the first rate coal—placing this city, for all the purpose of trade and intercourse, within a distance of Pittsburg not more than equal to forty-five miles of transportation by land.

8. *Its advantages to the sale and value of the Public Lands in the West.*—It is believed that nothing is better calculated to induce and facilitate the sale and settlement of the public lands, than opening to them those facilities of communication by which they can convey to the best markets the products of the soil: for, without the means of arriving at a market, there can exist no motive to stimulate industry or exertion. To shew the effects of roads and canals on the public lands, of which the United States own more than five hundred millions of acres undisposed of in the West, the Committee beg leave to introduce the following extract of a letter from the celebrated and lamented Robert Fulton to Mr. Gallatin, in 1808, on this branch of the subject:

"In all cases, he says, where canals shall pass through the lands "of the United States, and open a cheap communication to a good "market, such lands will rise in value for twenty miles on each side "of the canal. The farmer who will reside twenty miles from the ca-"nal, can, in one day, carry a load of produce to its borders; and, "were the lands 600 miles from one of our seaport towns, his barrel "of flour, in weight 200 lbs., could be carried that distance for 60 "cents, the price which is now paid to carry a barrel 50 miles on the "Lancaster turnpike. Consequently, as relates to cheapness of car-"riage, and easy access to market, the new lands, which lie 600 miles "from the seaports, would be of equal value with lands of equal fer-"tility, which are fifty miles from the seaports. But, not to insist on "their being of so great a value until population is as great, it is evi-"dent that they must rise in value in a three or four-fold degree; eve-"ry lineal mile of canal would accommodate 25,600 acres. The "lands sold by the United States, in 1806, averaged about two dollars "an acre, and certainly every acre accommodated with a canal would "produce six dollars. Thus, only 20 miles of canal, each year, run-"ning through national lands, raise the value of 512,000 acres at

"least four dollars an acre, giving 2,048,000 dollars to the Treasu-
"ry, a sum sufficient to make 136 miles of canal. Had an individual
"such a property, and funds to construct canals to its centre, he cer-
"tainly would do it for his own interest. The nation has the proper-
"ty, and the nation possesses ample funds for such undertaking."

9th. *Its advantage in reference to Currency.*—The Committee have already referred to the exhausting and injurious effects, of annually withdrawing from active and profitable circulation, fifteen millions of dollars a year, and applying it to the discharge of the National Debt, as proposed by the Committee of Ways and Means; and have suggested the propriety of confining the payment of the National Debt to ten millions of dollars a year, according to the existing Sinking Fund, and applying the surplus five millions of dollars to Internal Improvements: which would be as much as could be economically and judiciously expended, at the commencement of the system. It would be sufficient to afford employment, and give skill and experience to our Engineers, by the time the National Debt is extinguished, in 1833; and the annual surplus, applicable to these objects, increased to fifteen millions. It would, also, be returning, in the mean time, a portion of the money, (drawn from the People by taxation,) to sustain and carry on the several branches of Agricultural and Manufacturing industry, and, at the same time, equalizing, in some degree, at least, the expenditure of the public money: for it is a fact, worthy of grave consideration, and susceptible of the clearest proof, that, of the twenty odd millions which are collected annually, alike from every portion of the country, there is not expended by the Government, in the *whole of the interior and Western States*, as much annually, as has been expended on the sea coast, in the *building and equipping a single ship!! or half as much as has been expended in the erection of a single fortification!!!* This consideration, in the judgment of the Committee, strengthens the claims of the interior and the West, to a participation in the common means of the country, to which they contribute their full proportion.

10th. *Its advantages in reference to the diffusion of knowledge and intelligence.*—Nothing, perhaps, in a country so extensive as ours, tends more to the rapid dissemination and diffusion of knowledge and intelligence, among the People at large, than good roads and canals. They bring distant parts of the country more nearly together: promote trade and intercourse, and create friendly and social relations among those who, otherwise, would have, perhaps, remained not only strangers, but estranged from each other, by a diversity of feelings, views, and interests.

11th. *Its advantages as relates to profits, revenue, &c.*—On this branch of the subject, looking to the extent of navigation opened by this canal, connecting by the nearest possible route, all the Eastern and Western States, passing through the heart and centre of the country, traversing parts the most fertile and populous, and penetrating regions abounding with inexhaustible supplies of ore, coal, and timber, the Committee think they hazard nothing in expressing the

opinion, that this cannot fail to be one of the most profitable and productive canals, that has been, or can be constructed in the United States; constituting, as it must, the great artery of communication, and receiving the joint contributions of the Chesapeake, Ohio, and Mississippi Rivers. This canal, in fact, has a decided advantage over the canals constructing along the Atlantic seaboard, in this, that the canals running near and parallel to the seaboard, (to which the United States have liberally contributed,) are *mere improvements* of an existing navigation, along the coast; but this canal, penetrating the interior and Western portions of our country, is not an improvement, *merely*, but it is the *creation* of a navigation, where none before existed, and which, of necessity, must, and will be used by all; and this accounts for the profits of the New York canal, over which, the superiority of the Chesapeake and Ohio, in reference to climate, position, and distance, has been already demonstrated.

The tolls on the New York canal, during the year 1824, amounted to $340,761 07; in 1825, to $566,221 51; and for 1826, they are estimated at $750,000 00, exceeding 8 per cent. per annum, on its cost, at the low rate of one cent per ton per mile, on all agricultural and country produce, and three cents for merchandise, which, with the duty on salt and auctions, will give a surplus of $577,000 a year, to discharge the principal, after paying the interest on the debt, and all the expenses of repairs, collections, &c., amounting to $550,000. The number of boats and rafts which passed on the canal from 9th April to 12th December last, was 13,100, carrying 219,074 tons; 185,405 bound to, and 33,669 from, the city of New York; amounting to 42 boats per day, and the number of passengers exceeding 40,000.

But the Chesapeake and Ohio Canal is, in every point of view, more important than that of New York. It not only furnishes a connexion between the Atlantic and steam boat navigation of the Ohio, at much less than half the distance of the New York Canal, but, commencing at the seat of the National Government, it opens a direct internal navigation of near 2,500 miles, through the centre of the Union; while the New York Canal passes through but a single State, and terminates on our Northern frontier. And, besides, the Chesapeake and Ohio Canal has also the advantage of the coal trade of Cumberland, and the timber and iron mines of the mountain, which nature has denied to New York, and being four degrees farther South, will remain, at least two months in the year, longer unobstructed by ice. But, should the results only equal those of New York, the Committee think the Government ought immediately to commence, and vigorously prosecute it to its final completion, and might add, in the language of General Washington, who, more than forty years ago, when urging Congress to engage in this great work, said, "*our interest is so much in unison with this measure, that nothing "short of that ill-timed and misapplied parsimony, and contracted way "of thinking, which intermingle so much in our public councils, can "counteract it.*" Will not those who oppose this measure *now*, be-

come obnoxious to this emphatic denunciation of the Father of his Country ?—who, were it permitted to him to descend, and mingle in our present deliberations, might repeat it to us with much greater propriety, and stronger emphasis.

As the final report and estimates of the Board of Internal Improvement will not be completed before the close of the present session, and as it would not, in the judgment of the committee, be advisable to legislate on the subject until that report is communicated, they therefore submit the following resolution:

Resolved, That the committee be discharged from the further consideration of the subject, and that it be referred to the early and favorable consideration of the next session of Congress.

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SKETCH OF THE COUNTRY
Between the Waters of
POTOMACK and those of **YOUGHAGANY**
and
MONONGAHELA
as sketched by Gen.l Washington.

NOTE. *The point of connexion proposed at present by the U. States engineers in their late report is perhaps a mile lower down than the detted line A. B. as marked on the original map in 1784.*

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APPENDIX.

No. 1.

GEORGETOWN, 11th May, 1826.

DEAR SIR: I have received your esteemed note of the 6th instant. I need not say, that I shall always be ready to contribute every thing within my reach or power, to one of the most sublime schemes conceived in any country, that of the Ohio and Chesapeake Canal; but I pray you, sir, to be assured that it will, at all times, give me great pleasure to comply with any request of your's.

I have a large bundle of papers collected by General Washington, committed to me by himself a year or two before his death, in relation to the object of which we are now in pursuit; some of them, unfortunately, I entrusted to gentlemen, who have not returned them. In looking over the collection, I perceive none that I suppose would be useful to our present purpose, but the *nine* papers I now send you; they all bear the stamp of authenticity from his own hand, either being of his autography or bearing an endorsement from his pen. They embrace a period, as you will perceive, from 1754 to 1785: and will evince throughout, with what interest and accuracy he looked to the object.

The communications of the winter 1784—5, have relation to a conference held at that time in Annapolis, between the States of Virginia and Maryland, regarding the opening of the Potomac river, and certain roads from its head waters to those of the Ohio; to which General Washington, General Gates, and Colonel Blackburn, were deputed on the part of Virginia, but the latter gentleman did not attend on account of indisposition.

I commit to you, my dear sir, on this occasion the same trust that was placed in me by the great author and compiler of these papers—make such use of their contents as to you may seem best for the cause, in which they were prepared. Could he look down on us from the mansions above, he could but approve of the exertions now making to carry into execution the vast designs originated by his foresight and anxiety for the developement of the resources of our country.

I annex a list of the papers sent—be pleased to return them to me when you have done with them, as they are precious relics. Should they be wanted at a future session, they will be always ready in my hands.

I am, with great regard and
Respect, Dear Sir, your's,

J. MASON.

ANDREW STEWART, Esq.

Summary of the reports of Mr. Johnson,

Sketches of the country between the waters of the Potomac, and those of the Youghiogany and Monongahela.

From Captain Hanway, to General Washington, as to the communication between the waters of the Potomac and those of the West.

Dr. Craik to General Washington, on the communication between Wills' creek and the Youghiogany.

The first in General Washington's hand writing—the others bearing his endorsements.

Letter from General Washington, of 20th July, 1770, known to have been to the late Governor Johnson, of Maryland.

Letter from same to Joseph Jones, and James Madison, of 28th November, 1784

Letter from same to same, of 3d December, 1784.

Letter from same to James Madison, of 28th Dec. 1784.

Report of General Washington, and General Gates, to the General Assembly of the Commonwealth of Virginia, dated 28th December, 1784, respecting conference with the State of Maryland at Annapolis.

These last five in General Washington's hand writing.

No. 2.

Summary of the Reports of Mr. Johnson, Mr. Semple, and G. Washington, respecting the navigation of Potomac River—by General Washington.

From the mouth of Patterson's creek to the beginning of Shenandoah falls, there is no other obstacles than shallow water, thence for six miles rocky, swift, and uneven water, in which distance there are four falls; the first tolerably clear of rocks, but shallow, may be much amended by a passage on the Maryland side. Two miles from this, and half a mile below the mouth of the Shenandoah is the spout; a considerable rapid of swift and uneven water, which is confined to a narrow passage; a passage to avoid this, by removing some rocks on the Maryland side, may be had. One of the other two falls is also swift and ugly, not much unlike the spout, but a passage between.

Eight miles lower down is another fall, but easy and passable. Two miles further are a cluster of small Islands, with rocks and rapid water—from hence to the Seneca Falls fine smooth water. Seneca falls not very difficult. Observations of G. W.—1754.

Mr. Semple.

From the Widow Brewster's, (two miles above the Great Falls,) there is good water for five miles to the Seneca Falls. Here continued rocks and rifts, for near a mile, easily passed between an island and the main by raising short dams. From the Seneca falls pretty good water to Payne's falls at most seasons this is a narrow rift of rocks extending across the river, which may be passed; though a natural channel inland. From hence to the spout, two miles—this is difficult and dangerous, made so by almost the whole water of the river being forced through a narrow rocky passage, which subjects vessels to the danger of filling; to be avoided by a channel inland—a mile higher above Harper's Ferry, an obstacle more difficult and expensive, requiring a channel to be dug and walled along the river at least half a mile, with rocks therein. Head or beginning of Shenandoah Falls next obstacle; here there is already a natural channel between the main and an island. Hence to Fort Cumberland, no other obstruction than shallow water in places.

Mr. Johnson.

From a little below Fort Frederick, to Caton's gut, little or no obstruction. House's fall, another rift, between that and Antietam, and what is called Sheppard's falls, a little below Shepherdstown, being the only obstructions, and which might easily be removed at very small expence. From Caton's gut to Payne's falls, (about five miles.)

No. 3.

Virginia, 20*th July*, 1770.

Sir: I was honored with your favor of the 18th of June, about the last of that month, and read it with all the attention I was capable of; from that time till now I have not been able to inquire into the sentiments of any of the gentlemen of this side in respect to the scheme of opening the inland navigation of Potomac, by private subscription, in the manner you have proposed—and, therefore, any opinion which I may now offer on this head will be considered I hope as the result of my own private thinking, not of the public.

That no person concerned in this event wishes to see an undertaking of the sort go forward with more sincerity and ardour than I do, I can truly assure you; and will, at all times, give any assistance in my power to promote the design; but I leave you to judge from the trial, which before this you have undoubtedly made, how few there are, (not immediately benefited by it,) that will contribute any thing worth while to the work; and how many small sums are requisite to raise a large one.

Upon your plan of raising money, it appears to me that there will be found but two kinds of people who will subscribe much towards it. Those who are actuated by motives of public spirit; and those again, who from their proximity to the navigation, will reap the salutary effects of it, clearing the river. The number of the latter, you must be a competent judge of; those of the former, is more difficult to ascertain; for which reason I own to you, that I am not without my doubts of your scheme falling through, however sanguine your first hopes may be from the rapidity of subscribers, for it is to be supposed that your subscription papers will probably be opened among those whose interests *must* naturally incline them to wish well to the undertaking, and consequently will aid it; but when you come to shift the scene a little, and apply to those who are unconnected with the river, and the advantage of its navigation, how slowly will you advance!

This, sir, is my sentiment, generally, upon your plan of obtaining subscriptions for extending the navigation of Potomac; whereas I conceive, that if the subscribers were vested by the two legislatures with a kind of property in the navigation under certain restrictions and limitations, and to be reimbursed their first advances with a high interest thereon, by a certain easy toll on all craft proportionate to their respective burthens, in the manner that I am told works of this sort are effected in the inland parts of England—or upon the plan of turnpike roads; you would add thereby a third set of men, to the two I have mentioned, and gain considerable strength by it. I mean the monied gentry; who, tempted by lucrative views, would advance largely on account of the high interest. This, I am inclined to think, is the only method by which this desirable work will ever be accomplished in the manner it ought to be; for, as to its becoming an object of public expense, I never expect to see it. Our interests (in Virginia, at least,) are too much divided. Our views too confined, if our finances were better, to suffer that, which appears to redound to the advantage of a part of the community only to become a tax upon the whole—though in the instance before us, there is the strongest speculative proof in the world to me of the immense advantages which Virginia and Maryland might derive, (and at a very small comparative expence) by making Potomac the channel of commerce between Great Britain, and that immense Territory; a tract of country, which is unfolding to our view the advantages of which are too great, and too obvious, I should think, to become the subject of serious debate, but which, through ill-timed parsimony and supineness, may be wrested from us and conducted through other channels, such as the Susquehanna, (which I have seen recommended by some writer) the lakes, &c. How difficult it will be to divert it afterwards, time only can show. Thus far, sir, I have taken the liberty of communicating my sentiments on the different modes of establishing a fund, but if from the efforts you have already made on the North side of Potomac, it should be found that my views are rather imaginary than real, (as I heartily wish they may prove,) I have no doubts but the same spirit may be stirred up on the South side, if gentlemen of influence in the counties of Hampshire,

Frederick, Loudoun, and Fairfax, will heartily engage in it, and receive all occasional sums, *received* from those who may wish to see a work of this sort undertaken, although they expect no benefit to themselves from it.

As to the manner in which you propose to execute the work, in order to avoid the inconvenience which you seem to apprehend from locks, I profess myself to be a very incompetent judge of it. It is a general received opinion I know, that, by reducing one fall, you too frequently create many; but how far this inconvenience is to be avoided by the method you speak of, those who have examined the rifts—the depth of water above, &c. must be infinitely the best qualified to determine. But I am inclined to think, that, if you were to exhibit your scheme to the public upon a *more extensive plan, than the one now printed, it would meet with a more general approbation; for so long as it is considered as a partial scheme, so long will it be partially attended to—whereas, if it was recommended to the public notice upon a* MORE ENLARGED PLAN, AND AS A MEANS OF BECOMING THE CHANNEL OF CONVEYANCE OF THE EXTENSIVE AND VALUABLE TRADE OF A RISING EMPIRE; and the operations to begin at the lower Landings, (above the Great Falls,) and to extend upwards as high as Fort Cumberland; or as far as the expenditure of the money would carry them; from whence the portage to the waters of Ohio must commence; I think many would be invited to contribute their mite, that otherwise will not. It may be said the expence of doing this will be considerably augmented. I readily grant it, but believe that the subscribers will increase in proportion; at any rate I think that there will be at least an equal sum raised by this means, and that the end of your plan will be as effectually answered by it.

G. W.

To Governor JOHNSON of Maryland.

No. 4.

MOUNT VERNON, 3*d December*, 1784.

GENTLEMEN: I returned yesterday from Annapolis, having conducted the Marquis La Fayette that far on his way to New York, and left him proceeding on the road to Baltimore, on Wednesday last.

This trip afforded me opportunities of conversing with some of the leading characters in the different branches of the Legislature of Maryland, on the subject of inland navigation, and the benefits which might arise from a commercial intercourse with the Western Territory.—I was happy to find them so forcibly struck with the importance of these objects; and that there appeared the most favorable disposition to give encouragement to them.

Like us, they have two interests prevailing in their assembly—or rather in the present instance like ourselves have two ways by which

the *same* interest is to be effected. The ill-grounded jealousies arising therefrom serves in some degree to embarrass this measure of public utility. The Baltimore interest has already obtained an act to encourage, and to empower a corporate company to remove the obstructions in that part of the Susquehanna, which lie within the territory of Maryland.—And this, I perceive, is all that can be obtained in behalf of Potomac, from that quarter.

As no public money, therefore, is likely to be obtained from that State. and as little chance perhaps of getting it from this—should not the wisdom of both assemblies be exerted without delay to hit upon such a happy medium as will not on the one hand, vest two much power and profit in a private company ;—and on the other to hold out sufficient inducements to engage men to hazard their fortunes in an arduous undertaking ?—If the act does not effect this the object of it is defeated ; and the business of course is suspended ; which, in my opinion, would be injurious ; as the present moment is important, favorable, and critical ; and the spirit for enterprize greater now than it may ever be hereafter.

It is to be apprehended the money lenders among the class of private gentlemen are but few ; resort, therefore, must be had to mercantile funds, from whence nothing can be extracted if there is not a prospect of great gain, present or future—but to you gentlemen, these observations are unnecessary, as you are better acquainted with public funds, and the circumstances of individuals than I am ; and I am sure are not to learn that the motives which predominate most in human affairs is self-love and self-interest.

The bill I sent you is exceptionable in some parts, and gives discontent in others—so I am informed,—for it came to my hands at a moment when I could not read, much less consider it. Would it not be highly expedient, therefore, as the session of both assemblies must soon draw to a close, for each to depute one or more members to meet at some intermediate place, and agree, (first knowing the sentiments of the respective assemblies,) upon an adequate bill to be adopted by both States ? This would prevent dissimilar proceedings, as unproductive as no bill—save time—and bring matters at once to a point. A measure of this kind is consonant, I know, with the ideas of some of the leading members of the Maryland Assembly, who requested me to suggest it to my friends in our assembly, and inform them of the result.

From what I can learn, there was in the meeting held at Alexandria too great a leaning to local advantages on one part, and too much compliance on the other part, to obtain general approbation of the bill which proceeded from it—I shall not pronounce on either side, but imperfections, if they really exist, at the meetings proposed, may be rectified ; and a liberal plan adopted which shall have no eye to the interested views of a few individuals to the prejudice of the majority ; who rather than damp the spirit which was up, resolved, it is said, to submit, to *any* plan, rather than impede the undertaking.

At such a meeting as has been suggested, of delegates from the

two assemblies of Virginia and Maryland, might it not prove a politic step for them to agree upon a representation to be made by their respective Assemblies *to the State of* PENNSYLVANIA, *of the political advantages which would flow from a close connection with the Western Territory; and to request their concurrence to make the communication through their State* AS EASY AND AS DIFFUSIVE AS POSSIBLE *?—pointing to the consequences which in the course of things must follow, if we do not open doors for their produce and trade. That State has many Delegates in the Assembly who would relish such a proposition highly.*—It would on our parts, appear attentive and respectful; and if rejected on theirs, place them (at least in the eyes of those people) in the wrong—and excite their reiterated applications, which most assuredly would effect it.

Another thing, in my opinion, should also be the object of this meeting, and that is to agree upon a sum, to be advanced by the States of *Virginia and Maryland*, for the purpose of opening a road between the Eastern and Western Waters.—The Company, (if one should be formed,) and the bill, having nothing to do with this—and the Western settlers are not in circumstances to effect it themselves.

With very great esteem and regard,

I am, gentlemen,

Your most obedient humble servant,

G. W.

JOSEPH JONES, and
JAMES MADISON, } Esqrs.

No. 5.

Extract of a Letter from James Craig to General Washington, dated Mount Vernon, October 2, 1784.

I have thought it might be more satisfactory to leave you the different accounts I received respecting the communication between the waters of the Youghiogany and the North branch of the Potomac, that you might, from a view of the whole, collect an opinion for yourself. It appears to me, that the land carriage from the Fork of Youghiogany to Cumberland, which, from a variety of accounts, will not be more than thirty miles, is to be preferred to sixty miles of difficult navigation up the Little Crossing, and twenty miles land carriage afterwards, which is the distance from the Little Crossing on the Turkey foot-road to Cumberland. If the communication is to be carried on by the Little Crossing, the Turkey Foot Road is to be preferred to Braddock's Old Road, as it is infinitely better, and above two miles shorter. Indeed I found the whole Turkey Foot Road across the mountains much better and nearer than Braddock's Road; that if there were good entertainment, no one could hesitate in the choice.

I have received of Lund Washington twelve pounds, seven shillings and sixpence, being the expenses down. The general account of expenses must be deferred until I have the pleasure of seeing you.

No. 6.

OLD TOWN, *January* 26, 1785.

SIR: In a short time after you left my office, I examined the falls of Cheat river, agreeable to your request; and find that it will be impossible to effect a navigation up it, through the Laurel Hills. I have made the strictest inquiry where the most advantageous and nearest communication by land can be had, from the North branch to the Western waters, and find it will be to the Falls of the Tyger Valley Fork of the Monongahela river; it will not exceed forty miles from Logstones Ford on the North Branch to the said Falls; and I have reason to believe, and am confident from my own knowledge of the greatest part of the way, and the information I have had of the other part, that a good road may be made. The falls of the Tyger Valley Fork is about nine miles from its junction with the West Fork, and upwards of thirty miles above the mouth of Cheat river, and near the centre of the most settled as well as most fertile part of the counties of Monongahela and Harrison, thence a navigation may easily be had up the West Fork; and consequently by a short land carriage down the Little Kenhawa.

I am, sir,

Your most obedient and very humble servant,

SAMUEL HANWAY.

His Excellency GENERAL WASHINGTON.

No. 7.

To the Honorable the Assembly of the Commonwealth of Virginia.

Pursuant to the resolves of the Honorable the Senate and House of Delegates, and conformably to the direction of the executive authority of the State, we repaired to the city of Annapolis, and held a conference with the gentlemen appointed by the Legislature of Maryland: the result of which is contained in the enclosure No. 1.

In consequence of the opinion given by the conference, the Legislature of Maryland have passed the Act inclosed, No. 2, and the Resolves, No. 3.

It may be necessary for us to explain the reason for the provision in the act "that if subscriptions should be taken in, or a meeting of

subscribers directed by the Legislature of Virginia, at times different from those in the Act, then there should be a meeting at the time appointed by Virginia; and subscriptions made at times by them appointed, should be received." It was thought by the conferees to be most proper to appoint certain times in the Act; but as it was doubtful whether the Act would get to Virginia in time to be adopted at the present session of the Assembly, it was judged necessary to make a provision to accommodate the scheme to an Act to be passed by Virginia, on the next session of their Assembly, without the necessity of having recourse again to the Legislature of Maryland; but it is the opinion of the conferees, that an act upon similar principles to that passed by Maryland ought, if possible, to be passed by the Assembly of Virginia at this session. This would give a speedy beginning to the work, and an opportunity of embracing the present favorable state of things for accomplishing the views of the two States.

The Act appears to us, from every consideration we can give it, to be founded on just and proper principles, and to be calculated to answer in every respect the purposes for which it is designed; we conceive it a duty therefore to declare, that it meets our entire approbation,

The reasons why this Act has not the signature of the Chief Magistrate are, because he is not present, and because it wants not this formality to give it validity.

We should do injustice to our feelings, were we not to add, that we have been happy in meeting gentlemen of liberality and candor, impressed with the importance of accelerating the purposes of the Legislature of Virginia, of opening a free and easy intercourse with the Western Territory, and for the extension of inland navigation; and that there has been a perfect accordance of sentiment in the Legislature of the State.

Respectfully submitted by

G. WASHINGTON, and
HORATIO GATES.

Annapolis, December 28th, 1784.

No. 8.

MOUNT VERNON, 28th Nov. 1784.

GENTLEMEN: After the several conversations we have had on the subject of inland navigation, and the benefits which would probably be derived from a commercial intercourse with the western territory, I shall make no apology for giving you the trouble of the enclosed. It is a matter of regret, however, that I cannot accompany them with some explanations and observations. It was intended they should have met me at Richmond, they missed me on the road—travelled to Baltimore—returned—and were put into my hands at the moment I was setting out for Annapolis, to which place

I mean to accompany the Marquis La Fayette, who expects to embark about the middle of next month at New York for France. I could not think of withholding these papers until my return, as I shall probably accompany the above gentleman from Annapolis to Baltimore; therefore, in the order I receive, I send them to you; your own judgment in this business will be the best guide, but, in one word, it should seem to me that, if the public cannot take it up with efficient funds, and without those delays which might be involved by a limping conduct, it had better be placed in the hands of a corporate company. What encouragement, and what powers to give this company, deserves all the consideration which I persuade myself, you, gentlemen, will bestow. The Maryland Assembly is now sitting, if I should return in time I will have the power of writing to you again on the subject; in the mean while, if your leisure will admit, I should be glad to know your sentiments on, and what will probably be the issue of, this business.

I am, &c.

To Joseph Jones and James Madison, Esqr's.

No. 9.

Annapolis, 28*th Dec.* 1784.

Dear Sir: I have been favored with your letter of the 11th. The proceedings of the conference and act and resolutions of this assembly consequently thereupon, herewith transmitted to the Assembly, are so full of explanations of the motives that governed in this business, that it is scarcely necessary for me to say any thing in addition to them, except that State seems highly impressed with the importance of the objects which we have had under consideration, and are very desirous of seeing them accomplished.

We have reduced most of the tolls from what they were in the first bill, and have added something to a few others. Upon the whole, we have made them as low, as we conceived, from the best information before us, and such estimates as we had means to calculate upon, as they can be fixed without hazarding the plan altogether. We made the value of the commodity the governing principle in the establishment of the tolls: but having an eye to some bulky articles of produce, to the encouragement of the growth and manufacture of some others, as well as to prevent a tedious enumeration of the different species of all, we departed from the general rule in many instances.

The rates of tollage, as now fixed, may still appear high to some of the southern gentlemen, when they compare them with those on James' river, but as there is no comparison in the expence and risk of the two different undertakings, so neither ought there to be in the tolls. I am fully persuaded that the gentlemen who were appointed, and have had this matter under consideration, were actuated by no other motives than to hit, (if they could do so,) upon such a happy medium as would

not give jealousy to the public on one hand, nor discouragement to adventurers on the other. To secure success and to give vigor to the undertaking, it was judged advisable for each State to contribute (upon the terms of private subscribers,) to the expence of it, especially as it might have a happy influence on the minds of the western settlers.* Though there is no obligation upon the State to adopt this, if it is inconvenient or repugnant to that opinion, yet I should be highly pleased to hear that they had done so, as also the resolution respecting the roads of communication, both of which look, in some degree, to different objects, are both very important. That by the Youghiogany (through Pennsylvania.) is particularly so for the fur and peltry of the lakes, because it is the most direct route by which they can be transported, whilst it is also exceedingly convenient to the people inhabiting the Ohio, or Alleghany, above Fort Pitt, the lower parts of the Monongahela, and all the Youghiogany.

Matters might perhaps have been better digested if more time had been allowed, but the fear of not getting the report to Richmond before the Assembly should have risen, occasioned more hurry than accuracy, or even real despatch. But to alter the act now further than to accommodate it to circumstances where it is essential, unless there be discovered something obviously wrong, it will not do. The bill passed this Assembly with only nine dissenting voices, and got thro' both Houses in a day, so earnest were they to get it to you in time.

It is now near twelve at night, and I am writing with an aching head, having been constantly employed on this business since the 22d, without any assistance from my colleagues, General Gates being sick and Colonel Blackburn not attending: but for this I would say more.

I am, &c.

G. WASHINGTON.

JAMES MADISON, Esq.

MEMORIAL

Of the Central Committee of the Chesapeake and Ohio Canal Convention, and of the Commissioners appointed by the States of Virginia and Maryland, and by the United States, to open Books for Subscription of Stock to the said Canal.—April 3, 1826.

To the Senate and House of Representatives of the United States in Congress assembled, the Memorial of the Central Committee of the Chesapeake and Ohio Canal Convention, and of the Commissioners appointed by the States of Virginia and Maryland, and by the United States. to open books for the subscription of Stock to the said Chesapeake and Ohio Canal, respectfully represents:

That numerous assemblies of citizens of the States of Ohio, Pennsylvania, Maryland, and Virginia, and of the District of Columbia,

* It is to be observed that only part of this money can be called for immediately, even if the subscription fills, and afterwards, no faster than the work advances.

deeply interested in the improvement of the navigation of the waters of the Ohio and Potomac rivers, and their connexion by a continued Canal, deputed Delegates to a Convention in the City of Washington, empowered to digest and to promote the adoption of the best means of accomplishing the above object.

This Convention met in the Capitol of the United States, on the 6th day of November, 1823, and agreed upon the resolutions contained in the annexed Journal of their Proceedings. Pursuant to one of those resolutions a supervising Central Committee was appointed to correspond with, and to harmonize the views of the dispersed friends of the common enterprise, and to recommend to the Legislatures of the States of Ohio, Pennsylvania, Maryland, and Virginia, and of the United States, the exclusive sovereign of the District of Columbia, a combined system, conformable to the views of the Convention.

After much ineffectual legislation, and consequent delay, the States of Virginia and Maryland, at length concurred in chartering a Joint Stock Company, with authority to extend a Canal from the tide of the Potomac, to the navigable waters of the Ohio, under certain conditions set forth in their acts of incorporation. Among those conditions, it is provided, that the proposed Canal shall consist of two sections; one denominated the Eastern, to commence within the District of Columbia, and passing up the valley of the Potomac, to terminate amidst the coal banks, at the base of the Alleghany: the other, or Western section, after crossing that mountain, to reach a point on the Western waters, already accessible by the steam boats of the Ohio.

That the Eastern section shall be first executed, and the authority to begin and finish it be deemed complete, on receiving the sanction of the Congress of the United States, and the assent of the existing Potomac Company, in whom the States of Maryland and Virginia had, by acts anterior to the ratification of the Federal Constitution, vested all their rights to improve the river Potomac, and its tributary streams, for the purposes of navigation. That the authority to complete the Western section should await the concurrent assent of the Legislature of Pennsylvania, and the subscription of funds adequate to the accomplishment of the entire work.

The sanction required of the United States, was conferred by an act of the last Congress, approved by the President, on the 3d day of March, 1825.

The Potomac Company complied with the terms of the new charter, by their resolutions of the 16th day of May, 1825; a copy of which, with the preceding acts, is annexed to this Memorial, together with such Abstracts from the charter of the Old Company, and the proceedings thereof, as manifest the extent and value of the rights which they have conditionally surrendered.

By these several acts and resolutions, a complete authority is provided, for any company, which they may create, to begin and complete the Eastern section of the Chesapeake and Ohio Canal.

On the 7th day of February, 1826, the Legislature of Pennsylva-

nia, by an act, of which, a copy is hereto subjoined, gave their conditional assent to the common charter.

An inadvertent mistake, believed to be within the reach of judicial correction, having its origin, it is supposed, in a hasty transcription or engrossment of the original act of Virginia, the basis of the new charter, the Legislature of that State have deemed it expedient to correct. by an explanatory act hereto subjoined.

In the execution of these several acts, the President, during the past summer, appointed three Commissioners, in behalf of the United States; and at subsequent periods, the Executives of Maryland and Virginia severally deputed, each, three Commissioners, on behalf of their respective States, to co-operate jointly in obtaining subscriptions of stock to the Canal, so authorized to be constructed.

The late President of the United States, in his Message at the opening of the first Session of the Eighteenth Congress, adverting to the recent Convention in Washington, earnestly recommended the object of your memorialists, and in order to place beyond doubt its practicability, advised that a survey should be made of the "*unexplored ground*," over which the proposed Canal was to be conducted. The Commissioners, apprised by the report of this survey, from the United States' Board of Internal Improvement to the last Congress, that a further report would be made to the present, have delayed the performance of the duty charged upon them, until the estimates expected to accompany that report should be completed.

In the interim of this unavoidable, though regretted delay, by a legislative act of the 8th of March, 1826, the 19th, 20th, 21st sections of which, are hereto annexed, the State of Maryland has authorized, upon certain conditions, subscriptions of half a million of dollars to the stock, which may be required for the completion of the Eastern section of the contemplated Canal.

To these conditions, and especially to those of them which render the validity of the subscription of Maryland dependent on the co-operation of the Government of the United States, in subscribing to the same stock, your memorialists beg leave to solicit your attention. They confidently believe that upon that co-operation, the success of their whole enterprise must ultimately rest.

In asking as early an attention as may be consistent with the public interest, to this object of their Memorial, your memorialists do not desire to anticipate the expected estimates of the United States' Board of Engineers, by a pledge of any part of the public revenue, to the accomplishment of a work, which should not, they are aware, be undertaken without due consideration, nor begun, without adequate resources. They seek to obviate, as far as is within their power, the consequences of a yet farther delay of those estimates, by placing before you their Memorial, with the acts of the several States, in behalf of whose citizens they address you.

Your memorialists do not presume to prescribe to your better judgment, the extent, or the conditions of any subscription, which the interests of the Union and your wisdom may sanction. They solicit an

ample investigation of all the grounds, on which they rest their appeal to the policy of an enlightened, and to the zeal of a patriotic Legislature. They commit to you the fate of an enterprise, the practicability of which has already been placed beyond the possibility of doubt; the accomplishment of which is obviously within your power; and which, if accomplished, cannot but redound to the honor of the age, and to the prosperity of the country which shall give it birth, and conduct it to maturity.

If they may be allowed to enlarge on so fruitful a topic, in the short compass of a Memorial, already, perhaps, too extended, they invite you to exercise the authority of a proprietor of the public property in this city, and of that which covers so large a region of the West, and to compute the almost incalculable value which the fulfilment of their purpose must add to the national domain.

As the Legislature of a District and People, whose hopes of future prosperity are wrapt up in this measure, and who have no other political guardian than yourselves, they ask of you the exercise of the provident care of an irresponsible, but paternal sovereign.

As the Federal Depository of the common safety from foreign danger, they appeal to your foresight, to profit by the past, and to provide, amidst the prosperity of peace, for the exigencies of future wars;—to accumulate, in an imperishable form, treasure, to defray its cost when such calamity shall unfortunately come, and to assure, by the same means, the prompt concentration, and speedy direction of the resources of the Union, for the defence and security of its members.

As the efficient spring of the diffusion of commercial, social, and political intelligence, over a widely extended territory, they ask you to facilitate the intercourse of its People, who, though divided by many chains of mountains, have a constitutional right to regard each other as fellow citizens, friends, and brothers.

As the only medium of negotiation among the several States of this Union, your memorialists ask the General Government to secure to those States the practical benefit of a commercial intercourse with each other, and an open and easy access to the markets of the world. In regulating the trade of the Eastern and Western portions of this Union, by virtue of your acknowledged authority,—to afford to both, the readiest exchange of their respective superfluities, and to extend to labor and industry, by thus augmenting the value of their fruits, their appropriate and just reward.

As the equal guardian of the rights of all classes of society, may your memorialists not ask you to restore to agriculture, by cheapening the carriage of its heavy products, that surplus revenue, which has been avowedly created for the benefit of manufactures, and thus to enable internal trade to heal the dissensions of those jarring interests, by the interchange of reciprocal benefits?

Combining with multiplied powers of taxation, facilities of borrowing, enhanced by the superior credit of a common government, may not your memorialists appeal both to economy and justice, to reduce the cost of those public works, which, designed for the welfare of all

the States, have a claim for their execution, on the common wealth? If any such work be the joint offspring of public and private contributions, and be also calculated greatly to increase the annual exports of the United States, in prescribing, by the most contracted policy, limits to its *cost*, the revenue resulting from the consequent augmentation of foreign imports should be computed along with the sum of its tolls: and, if the relative interest become the measure of the relative subscription of the Government, as a stockholder, to that of all other subscribers to the same work, this proportion cannot be computed at less, than the actual ratio of the aggregate of both sums, to that *cost*.

Finally, regarding you as the political bond of a common Union, your memorialists implore you to perpetuate its duration, by multiplying, in the simplest form, its most substantial blessings.

At a Convention of Delegates, from the States of Virginia, Maryland, Pennsylvania, Ohio, and the District of Columbia, holden at the Capitol, in the City of Washington, on the 6th, 7th, and 8th of November, 1823, *the following preamble and resolutions were considered and adopted:*

Whereas a connection of the Atlantic and Western Waters, by a Canal leading from the seat of the General Government to the River Ohio, regarded as a local object, is one of the highest importance to the States immediately interested therein, and, considered in a national view, is of inestimable consequence to the future union, security, and happiness, of the United States:

Resolved, unanimously, That it is expedient to substitute, for the present defective navigation of the Potomac River above tide water, a navigable Canal, by Cumberland to the mouth of Savage Creek. at the eastern base of the Alleghany, and to extend such Canal, as soon thereafter as practicable, to the highest constant steam-boat navigation of the Monongahela or Ohio River.

That the most eligible mode of attaining this object, will be by the incorporation of a joint stock company, empowered to cut the said Canal through the territory of the United States in the District of Columbia, and of the States of Virginia, Maryland, aud Pennsylvania; and, therefore, that committees be appointed, each consisting of five Delegates, to prepare and present, in behalf of this Assembly, and in co-operation with the Central Committee, hereinafter provided, suitable memorials to the Congress of the United States, and the Legislatures of the several States before named, requesting their concurrence in the incorporation of such a company, and their co-operation, if necessary, in the subscription of funds for the completion of the said Canal:

And, whereas, by an act of the General Assembly of the State of Virginia, which passed the 22d February, 1823, entitled "An act incorporating the Potomac Canal Company," the assent of that State,

so far as the limits of her territory renders it necessary, is already given to this *object*, and for *its* enlargement, to the extent required by the preceding resolution, the said act appears to furnish, with proper amendments, a sufficient basis:

Be it therefore Resolved, That it will be expedient to accept the same as a charter for the proposed Company, with the following modifications, viz:

That, in reference to its enlarged purpose, the name be changed to "The Chesapeake and Ohio Canal."

That provision be made for the assent of the Government of the United States, and of the State of Pennsylvania, to the said act, and that the act be made to correspond in its details with such provision.

That the Union Canal shall be divided into two sections, Eastern and Western; the former of which shall correspond in description with that of the Chesapeake and Ohio Canal, by the preceding resolution, and the latter shall begin at the western extremity of the former, and terminate at the head of the steam-boat navigation of the Monongahela or Ohio River.

That while the act shall allow a reasonable time for the commencement and completion of both sections of the Canal, no other forfeiture shall be incurred, after the eastern section is finished, for a failure to begin or complete the western section, within the term prescribed, except of the right to complete such section and of all interest therein.

That, while the consent of Pennsylvania is provided for, in the amended act, it shall not be indispensably requisite to the validity of the charter, so far as respects the authority granted by it, to extend the Union Canal to the Pennsylvania line.

That it will be both just and expedient, if not absolutely necessary, to limit the interest of the stockholders of the Potomac Company, in the stock of the Chesapeake and Ohio Canal, in the mode provided by the unanimous resolution of the company, of the 7th day of February last, a copy of which is hereto annexed.

That the said Canal shall not, in width, be less at the surface than 40 feet, at its bottom than 28, nor its depth of water be short of four feet, except where, from the nature of the ground, it may be necessary, for the greater security of the banks of the Canal, to reduce its breadth at its base to less than 28 feet.

That the act aforesaid be amended, by inserting, in lieu of the 18th section thereof, the following:

And be it further enacted, The right to the waters of the River Potomac, for the purpose of any lateral Canal or Canals, which the State of Virginia or Maryland may authorize to be made, in connection with the said Canal, is reserved to the said States respectively: that a similar right is reserved to the State of Pennsylvania in relation to the rivers and streams within the territory of that State, the waters of which may be used in supplying the western section of the said Canal: that the Government of the United States shall retain the power to extend the said Canal in or through the District of Columbia, on either or both sides of the River Potomac; and the State of Maryland or

Virginia shall be empowered, under the sanction given by the United States to this act, to authorize any such extension for the purpose of meeting any Canal so extended, by any other Canal which either State may deem it expedient to conduct in any direction whatever through its territory.

Provided, however, That no part of the waters of the River Potomac, or of any other river or stream, required to ensure the constant, safe, and convenient use of the navigation of the Canal hereby authorized to be made, shall be, by any such lateral or continued Canal, diverted therefrom to the impediment or injury of the said navigation.

That, in addition to the provision contained in the first section of the act aforesaid, there be grounded, on the event of its failure to furnish adequate funds for the completion of the Eastern section of the Canal, to be obtained through separate acts of the respective Governments and Corporations, of the States of Maryland and Virginia, of the United States, and of the three Cities of the District of Columbia, a subscription, to the amount, if necessary, of 2,750,000 dollars, in the following proportions: $\frac{2}{11}$ to be subscribed by the State of Maryland, $\frac{3}{11}$ by the State of Virginia, $\frac{4}{11}$ by the United States, and $\frac{2}{11}$ by the District Cities, to be divided between them, according to an equitable ratio, to be fixed by themselves. In case a part of the sum aforesaid shall be subscribed, by private individuals, in the mode provided by the act aforesaid, the several States and Corporations, within which such individual subscriptions are received, shall be requested to assume, as part of their aforesaid quotas, the amount of such subscription, under such security as they may deem expedient for the payment thereof, by the subscribers, to them respectively.

That the Government of the United States be earnestly solicited to obtain the whole of this sum on loan, receiveable in four annual instalments, upon the issue of certificates of stock, bearing an annual interest, not exceeding five per cent., and irredeemable for thirty years, and to guaranty the repayment thereof on a specific pledge of the public lots in the City of Washington, of the United States' stock in the Canal, and the public faith.

That the first instalment of the loan be made payable on the 1st of March, 1825, and the last on the 1st of March, 1829.

That the interest of each State and Corporation upon its proportion of the said loan be paid into the Treasury of the United States, according to the terms of the loan, and the principal sum at the expiration of thirty years, the period to be fixed for its redemption.

That, in the event of a refusal by the Government of the United States to negotiate the said loan, each State and Corporation shall provide the amount of its respective subscription in such manner as may seem to it best.

That the maximum profit of the said Company shall not exceed 15 per cent after the entire Canal shall have been completed; but, if, at any time after the completion of the eastern section thereof, and before sufficient funds shall have been otherwise provided for the completion of the western, the tolls of the Canal shall yield a nett income

to the stockholders exceeding ten per cent. per annum, such excess shall be applied towards the extension of the Canal until the western section shall have been completed; and to give more speedy effect to this provision, the President and Directors of the Chesapeake and Ohio Canal Company shall be authorized to borrow, or may negotiate, through a suitable agency, in behalf of the Company on the credit of such excess, or on the tolls or a fixed part thereof, levied upon certain commodities passing through the said Canal, being the probable amount of such annual excess, such sums of money as may be deemed expedient, by a general meeting of the Stockholders, to be applied to the extension of the western section of the Canal, from time to time, till the said section shall have been completed. And if, after the completion of the entire Canal, the nett dividends shall exceed 15 per cent. per annum, such excess shall be applied, first to strengthening the works of the Canal, next to the multiplication of ascending locks from the River Potomac to the level of the Canal, wherever the convenience of the adjacent country may require it; next, to lining the Canal throughout, with such walls of stones as shall accommodate its banks to the use of steam boats; and should the nett dividends still exceed fifteen per cent. then such excess shall be applied to the reduction of the tolls upon the said Canal, according to some equitable scale.

And be it further Resolved, That a Committee of five Delegates be appointed to prepare, and cause to be presented, in behalf of this Convention, a suitable memorial to the State of Ohio, soliciting the co-operation of that State in the completion of the Chesapeake and Ohio Canal, and its ultimate connexion with the navigation of Lake Erie; and that, for the latter purpose, the memorial shall respectfully suggest the expediency of causing the country, between the northernmost bend of the river Ohio, and the Southern shore of Lake Erie, together with the waters of Great Beaver and Cayuga creeks, and all other intervening waters near the said route, to be carefully surveyed, with the view of ascertaining the practicability and probable cost of a Canal, which, fed by the latter, shall connect the former.

That a letter be addressed by the Chairman of the Convention, to the Mayors of Alexandria, Georgetown, and Washington, apprising, through them, their respective Corporations, of the proceedings of this Convention, and inviting their zealous co-operation in giving to them effect.

That another letter be addressed, by the Chairman, in behalf of this Convention, to the President and Directors of the Potomac Company, requesting their concurrence in the measures recommended by the preceding resolutions.

Resolved, That the Committee before named be, and they are hereby, authorized and requested to use their best exertions to obtain the most favorable reception for their memorials, to ascertain and communicate to the Central Corresponding Committee, hereinafter named, such objections, if any, as are opposed to the prayers of their respective memorials, and to devise, if possible, in conjunction with the common friends of the union and prosperity of the United States, the means of obviating all the impediments to their success.

Resolved, That, for the last mentioned purpose, the Delegates of the respective counties and corporations, represented in this Convention, be regarded also as Corresponding Committees, and that thirteen Delegates be appointed a Central Committee of Correspondence, to confer with the Committees before named, and to hold stated meetings in the City of Washington, for the purpose of consulting upon, and adopting in behalf of, the Chesapeake and Ohio Canal, such measures as may seem best calculated to assure its certain and speedy completion.

JOSEPH KENT, *Chairman.*

WALTER JONES, *Secretary.*

List of the several Committees appointed by the Chairman, in pursuance of the resolutions of the Chesapeake and Ohio Canal Convention.

The Central Committee.

Charles F. Mercer
John Mason
Walter Jones
Thomas Swan
John McLean
William H. Fitzhugh
H. L. Opie
Alfred H. Powell
P. C. Pendleton
A. Fenwick
John Lee
Frisby Tilghman
Robert W. Bowie.

Committee for Virginia.

Philip C. Pendleton
H. L. Opie
J. C. Hunter
W. Ellzey
Nathaniel Burwell.

Committee for Pennsylvania.

James Shriver
James Shannon
John McMahan
Daniel Kincheloe
George Hagan.

Committee for Maryland.

Grafton Duvall
George Mason, of Charles co.
T. Kennedy
J. C. Herbert
James Forrest.

Committee for Ohio.

John McLean
Walter Smith
Benjamin S. Forrest
Thomas Carbery
H. Peake.

To Memorialize Congress.

Walter Jones
John Mason
G. W. P. Custis
Robert I. Taylor
S. H. Smith.

Extract from the President's Message to Congress, at the commencement of the Session, December 3, 1823.

"Many patriotic and enlightened citizens, who have made the subject an object of particular investigation, have suggested an improvement of still greater importance. They are of opinion that the waters of the Chesapeake and Ohio may be connected together by one continued canal, and at an expense far short of the value and importance of the object to be obtained. If this could be accomplished, it is impossible to calculate the beneficial consequences which would result from it. A great portion of the produce of the very fertile country through which it would pass, would find a market through that channel. Troops might be moved with great facility in war, with cannon, and every kind of munition, and in either direction. Connecting the Atlantic with the Western country, in a line passing through the Seat of the National Government, it would contribute essentially to strengthen the bond of union itself. Believing, as I do, that Congress possess the right to appropriate money for such a national object, (the jurisdiction remaining to the States through which the canal would pass,) I submit it to your consideration whether it may not be advisable to authorize, by an adequate appropriation, the employment of a suitable number of the officers of the Corps of Engineers, to examine the unexplored ground, during the next season, and to report their opinion thereon. It will likewise be proper to extend their examination to the several routes through which the waters of the Ohio may be connected, by canals, with those of Lake Erie."

ACT OF THE STATE OF VIRGINIA.

An act incorporating the Chesapeake and Ohio Canal Company.—[Passed January 27, 1824.]

Whereas, a navigable canal from the tide water of the river Potomac, in the District of Columbia, to the mouth of Savage creek, on the north branch of said river, and extending thence, across the Alleghany mountain, to some convenient point on the navigable waters of the river Ohio, or some one of its tributary streams, to be fed, through its course on the east side of the mountain, by the river Potomac, and the streams which empty therein, and on the western side of the mountain, and in passing over the same, by all such streams of water as may be beneficially drawn thereto by feeders, dams, or any other practicable mode, will be a work of great profit and advantage to the people of this State, and of the neighboring States, and may ultimately tend to establish a connected navigation between the eastern and western waters, so as to extend and multiply the means and facilities of internal commerce, and personal intercourse between the two great sections of the United States, and to interweave more closely all the mutual interests and affections that are calculated to

consolidate and perpetuate the vital principles of Union; and whereas, it is represented to this General Assembly, that the Potomac Company are willing and desirous that a charter shall be granted to a new company, upon the terms and conditions hereinafter expressed; and that the charter of the present company shall cease and determine:

1. *Be it therefore enacted by the General Assembly of Virginia*, That, as soon as the Legislatures of Maryland and Pennsylvania, and the Congress of the United States, shall assent to the provisions of this act, and the Potomac Company shall have signified their assent to the same, by their corporate act, a copy whereof shall be delivered to the Executives of the several States aforesaid, and to the Secretary of the Treasury of the United States, there shall be appointed by the said Executives and the President of the United States, three Commissioners on the part of each State, and the Government of the United States, any one of whom shall be competent to act for his respective government. The said Commissioners shall cause books to be opened at such times and places as they shall think fit, in their respective States, and the District of Columbia, under the management of such persons as they shall appoint, for receiving subscriptions to the capital stock of the company hereinafter incorporated; which subscriptions may be made, either in person or by power of attorney; and notice shall be given in such manner as may be deemed advisable, by one or more of the said commissioners, of the time and places of opening the books.

2. And the said commissioners shall cause the books to be kept open at least forty days. And within twenty days after the expiration thereof, shall call a general meeting of the subscribers at the City of Washington, of which meeting notice shall be given, by a majority of the commissioners aforesaid, in at least four of the newspapers printed in Pennsylvania, Maryland, Virginia, and the District of Columbia, at least twenty days next before the said meeting; and such meeting shall, and may be continued from day to day, until the business is finished; and the commissioners at the time and place aforesaid, shall lay before such of the subscribers as shall meet according to the said notice, the book containing the state of the said subscriptions: and, if one fourth of the capital sum of six millions of dollars should appear not to have been subscribed, then the said commissioners, or a majority of them, at the said meeting, are empowered to take and receive subscriptions to make up such deficiency, and may continue to take and receive such subscriptions for the term of twelve months thereafter; and a just and true list of all the subscribers, with the sum subscribed by each, shall be made out, and returned by the said commissioners, or by a majority of them, under their hands, to the Board of Public Works of this State, to the Governor and Council of the State of Maryland, to the Secretary of State of the State of Pennsylvania, and to the Secretary of the Treasury of the United States, to be carefully preserved; and in case more than six millions of dollars shall be subscribed, then the sum subscribed shall be reduced to

that amount, by the said commissioners, or a majority of them, by beginning at and striking off a share from the largest subscription or subscriptions, and continuing to strike off a share from all subscriptions under the largest and above one share, until the same is reduced to the capital aforesaid, or until a share is taken from all subscriptions above one share; and lots shall be drawn between subscribers of equal sums, to determine the number of shares which each subscriber shall be allowed to hold, on a list to be made for striking off as aforesaid; and if the sum subscribed still exceed the capital aforesaid, then to strike off by the same rule, until the sum subscribed is reduced to the capital aforesaid, or all the subscriptions reduced to one share respectively; and, if there still be an excess, then lots shall be drawn to determine the subscribers who are to be excluded, in order to reduce the subscription to the capital aforesaid; which striking off shall be certified on the lists aforesaid; and the said capital stock of the company, hereby incorporated, shall consist of six millions of dollars, divided into sixty thousand shares, of one hundred dollars each; of which every person subscribing may take, and subscribe for, one or more whole shares; and such subscriptions may be paid and discharged either in the legal currency of the United States, or in the certificates of stock of the present Potomac company, at the par or nominal value thereof, or in the claims of the creditors of the said company, certified by the acting President and Directors to have been due, for principal and debt, on the day on which the assent of the said company shall have been signified by their corporate act as hereinbefore required: *Provided*, that the said certificates of stock shall not exceed, in the whole amount, the sum of three hundred and eleven thousand one hundred and eleven dollars and eleven cents; nor the said claims the sum of one hundred and seventy-five thousand eight hundred dollars: *Provided, also*, that the stock so paid for in certificates of the stock of the present company, and of the debts due from the said company, shall be entitled to dividend, only as hereinafter provided: and that no payment shall be received, in such certificates of stock, until the Potomac company shall have executed the conveyance prescribed by the thirteenth section of this act: *And, provided*, that, unless one-fourth of the said capital shall be subscribed, as aforesaid, all subscriptions made in consequence of this act, shall be void; and in case one-fourth, and less than the whole capital, shall be subscribed as aforesaid, then the said commissioners, or a majority of them, are hereby empowered and directed to take and receive the subscriptions, which shall first be offered in whole shares, as aforesaid, until the deficiency shall be made up; a certificate of which additional subscription shall be made, under the hands of said commissioners, or a majority of them, for the time being, and returned as aforesaid.

3. *And be it further enacted*, That, whenever one-fourth, or a greater part of the said stock shall have been subscribed, in the manner aforesaid, then the subscribers, their heirs, and assigns, shall be, and are hereby declared to be, incorporated into a company, by the

name of the "Chesapeake and Ohio Canal Company," and may sue, and be sued, and, as such, shall have perpetual succession, and a common seal; and the estates, rights, and interests of the said company, shall be adjudged and taken in law to be real estate; and it shall, thereupon, be the duty of the said commissioners, or a majority of them, to call a general meeting of the said subscribers, at such time and place as they, or a majority of them, shall appoint, after advertising the same in such public prints as they, or a majority of them, may think proper: and such of the said subscribers as shall be present at the said meeting, or a majority of them, are hereby empowered and required to elect a president and six directors, for conducting the said undertaking, and managing all the said company's business and concerns, for, and during such time, not exceeding three years, as the said subscribers, or a majority of them, shall think fit; and, in counting the votes of all general meetings of the said company, each member shall be allowed one vote for every share, as far as ten shares, and one vote for every five shares above ten, by him or her held at the time, in the stock of the said company; and any proprietor, by writing, under his or her hand, executed before two witnesses, may depute any other member or proprietor, to vote and act as proxy for him or her, at any general meeting: *Provided, also,* That no officer or director of said company shall, under any circumstances, be allowed to vote on any stock but his own.

4. *And be it further enacted,* That the said president and directors and their successors, or a majority of them, assembled, shall have full power and authority to appoint, and, at their pleasure, dismiss such engineer or engineers, and agent or agents, as they may deem expedient, and to fix their compensation; and to agree with any person or persons, on behalf of the said company, to cut canals, erect dams, open feeders, construct locks, and perform such other works, as they shall judge necessary or expedient, for completing the canal hereinbefore mentioned and described; and, out of the money arising from the subscriptions, and tolls, and other aids, hereinafter given, to pay for the same, and to repair and keep in order the said canals, locks, and other works necessary thereto, and to defray all incidental charges; and also to appoint a treasurer, clerk, and other officers, toll-gatherers, managers, and servants, as they shall judge requisite, and to agree for, and settle, their respective wages or allowances; and to settle, pass, and sign their accounts; and also to make and establish rules of proceeding, and to transact all other business and concerns of the said company, in and during the intervals between the general meetings of the same; and they shall be allowed, as a compensation for their trouble therein, such sum of money as shall, by a general meeting of the stockholders, be determined: *Provided always,* That the Treasurer shall give bond, in such penalty, and with such security, as the said President and directors, or a majority of them, shall direct, for the true and faithful discharge of the trust reposed in him, and that the allowance to be made him for his services shall not exceed three dollars in the hundred for the disbursements by him

made; and that no officer in the company shall have any vote in the settlement or passing of his own account.

5. *And be it further enacted*, That, on all subscriptions which shall not be paid, as hereinbefore provided, in certificates of the stock, or debts of the present Potomac company, there shall be paid at the time of subscription, on each share one dollar, and thereafter when the company shall be formed, the stock subscribed shall be paid on such instalments, and at such times, as the president and directors shall, from time to time, require, as the work advances: *Provided*, That not more than one-third part shall be demanded within any year from the commencement of the work; nor any payment demanded, within any year, from the commencement of the work; nor any payment demanded, until at least sixty days public notice thereof shall have been given, in such public newspapers as the said president and directors shall direct such notices to be published in; and, whenever any subscriber shall fail to pay any instalment, called for by the company, it shall and may be lawful for the company, upon motion to be made in any court of record, after ten days' notice, to obtain judgment against the subscriber so failing to pay; or the said company, at their option, may, after giving sixty days notice, in such public newspaper, printed within the District of Columbia, as they may judge proper, sell the stock of such subscriber; and, if the proceeds of any such sale shall exceed the sum demanded, the surplus, after paying the expenses of such sale, shall be paid to the subscriber so failing, or to his legal representatives; and the purchaser, at such sale, shall become a stockholder, and be subject to the same rules and regulations, and entitled to the same privileges, rights, and emoluments, as original subscribers under this act.

6. And to continue the succession of the said president and directors, and to keep up the same number: *Be it enacted*, That, from time to time, upon the expiration of the said term for which the said president and directors were appointed, the stockholders of the said company, at the next general meeting, shall either continue the said president or directors, or any of them, or choose others in their stead, and, until such choice be made, the president and directors for the time being, shall continue in office; and, in case of the death, removal, resignation, or incapacity of the president, or any of the said directors, may and shall, in manner aforesaid, elect any other person or persons to be president and directors, in the room of him or them so dying, removing, or resigning; and may, at any of their general meetings, remove the president, or any of the directors, and appoint others for and during the remainder of the term for which such person or persons were at first to have acted.

7. *And be it enacted*, That every president and director, before he acts as such, shall take an oath or affirmation for the due execution of his office.

8. *And be it enacted*, That the presence of stockholders, having a major part of the stock at least, shall be necessary to constitute a general meeting of the stockholders, which shall be held on the first

Monday in June, in every year, at such convenient town or place as shall be, from time to time, appointed by the said general meeting: but if a sufficient number shall not attend on that day, the stockholders who do attend, may adjourn from time to time, until the stockholders holding the major part of the stock do attend, and the business of the company is finished; to which meeting the president and directors shall make report, and render distinct accounts of all their proceedings; and, on finding them fairly and justly stated, the stockholders then present, or a majority of them, shall give a certificate thereof, a duplicate of which shall be entered on the company's books; and at such yearly general meetings, after leaving in the hands of the treasurer such sums as the stockholders, or a majority of them, shall judge necessary for repairs and contingent charges, an equal dividend of all the nett profits arising from the tolls hereby granted, shall be ordered and made to and among all the stockholders of the said company, in proportion to their several shares, subject to the provisions and enactments herinafter declared; and, upon any emergency in the interval between the said yearly meetings, the said president, or a majority of the said directors, may appoint a general meeting of the stockholders of the company, at any convenient town or place, giving at least one month's previous notice, in at least four of the newspapers in Pennsylvania, Maryland, Virginia, and the District of Columbia; which meeting may be adjourned and continued as aforesaid: and in case the stockholders, or a majority of them, in any general meeting aforesaid, shall deem it expedient to order a semi-annual, rather than a yearly dividend as aforesaid, then, in like manner, with like notice, and under like restrictions, there shall be a half-yearly, or semi-annual dividend of nett profits declared and paid.

9. *And be it enacted*, That, for and in consideration of the expenses the said stockholders will be at, not only in cutting the said canal, erecting locks and dams, providing aqueducts, feeders, and other works, and in improving and keeping the same in repair, the said canal and all other works aforesaid, or required to improve the navigation thereof at any time hereafter, with all their profits, subject to the limitations herein provided, and to none other, shall be, and the same are hereby, vested in the said stockholders, their heirs and assigns, forever, as tenants in common, in proportion to their respective shares, and be forever exempt from the payment of any tax, imposition, or assessment, whatsoever: and that it shall and may be lawful for the said president and directors, at all times, forever hereafter, to demand and receive, at such places as shall hereafter be appointed by the president and directors aforesaid, tolls for the passage of vessels, boats, rafts, produce, and other articles, at such rates as the said president and directors may hereafter allow and establish, according to the provisions of this act.

10. *And be it enacted*, That if the commissioners hereby required to be appointed, shall die, resign, or refuse to act, the vacancy occasioned thereby shall be filled by the same authority by which the original appointment was made; and the person or persons appointed to

fill such vacancy, shall have all the power and authority which was vested in the commissioner whose place he or they shall be appointed to supply: and when any part of the canal aforesaid shall have been completed, according to the true intent and meaning of this act, the president and directors of the company hereby created, shall have power, and it shall be their duty to ordain and establish a rate of tolls to be paid upon boats, vessels, rafts, or other property, passing on the part of the canal so completed, and so, from time to time, as part or parts shall be completed: and until the eastern section thereof shall be finished up the mouth of Savage river or creek; and, thereafter, until the entire canal shall have been finished according to the true intent and meaning of this act. For the collection of which tolls, the president and directors shall have power to establish so many toll-houses, and at their pleasure to appoint and remove so many collectors, and at such places as from time to time they may judge expedient; and the said president and directors shall have full authority, subject to the direction and control of a majority, in interest, of the stockholders represented in any general meeting, to regulate and fix a tariff of tolls, not exceeding an average of two cents per ton per mile; and so to adjust the said tolls, in relation to the capacity or burthen of the boats, and the dimensions of the rafts passing the locks of the said canal, as to promote economy of water and time, in the navigation thereof.

11. *And be it enacted*, That the president and directors shall, annually, or semi-annually, declare and make such dividend of the nett profits, from the tolls to be received according to the provisions of this act, and from the other resources of the company, as they may deem advisable, after deducting therefrom the necessary current, and the probable contingent expenses, to be divided among the proprietors of the stock of the said company, in proportion to their respective shares, in manner following; that is to say: if such nett profits shall not exceed ten per cent. on the amount of shares, which shall have been paid for in current money of the United States, and expended on the eastern section of the said canal, then the whole thereof shall be divided among the holders of such shares, in proportion to their respective shares; but, if such nett profits shall exceed the rate of ten per cent. per annum in any year, on such amount of stock, then the surplus shall be divided among such stockholders as shall have paid for their shares in certificates of the debts of the Potomac company, until they shall therefrom have received a dividend of six per cent.: and, if a surplus yet remain, the same shall be divided among the stockholders who shall have paid for their shares in certificates of the stock of the Potomac company, until they shall have received therefrom a dividend of six per cent. per annum on such shares; and if a surplus still remain, so long as the western section of the canal shall remain unfinished, such surplus shall be applied, from time to time, to the construction and completion thereof, in such mode as the president and directors, under such rules and regulations, not inconsistent with the Constitution of the United States, or of the

several States aforesaid, as the stockholders, or a majority thereof, in general meeting, may prescribe, until the western section of the canal shall be also completed; after which, if such surplus shall still arise, the same shall be divided among all the stockholders, without discrimination, in proportion to their respective shares, until the annual dividend thereon shall have reached fifteen per cent.; beyond which it shall never extend. But should the nett revenue of the company exceed that amount for any two years in succession, then such excess shall be applied, by the president and directors, in such mode as shall be agreed on by a majority of the stockholders convened in general meeting: first, to strengthening and improving the works of the canal of every description requiring the same: next, to the accommodation, where not already provided, of the inhabitants of the shores of the river Potomac, and of the country drained by the tributary streams thereof, now navigable, or which may hereafter become so, by affording to them, in the best practicable mode, a safe and easy access to the canal, from the surface of the main river, and of the said streams emptying therein: and, last of all, to the erection of such walls of stone or other materials, along the water margin of the canal, as shall fit the same for the navigation of steam boats of a size adapted to the said canal. And should the said tolls continue, after all such improvements have been completed, to nett more than fifteen per cent. per annum to the stockholders for any two years in succession, the tolls upon the same shall be reduced, by the president and directors, according to some just and equitable ratio, till the said dividend shall fall to fifteen per cent. per annum: *Provided*, that, should the said dividend thereafter sink below fifteen per cent. the said tolls, or a part thereof, may be renewed, till the said nett dividend reaches that amount. And for any, or all the within-mentioned purposes, the said president and directors are empowered to borrow, in behalf of the company, on the credit of such excess of tolls, such sum or sums of money, as they may deem expedient, at such rate of interest, and with such delay of payment, as they may stipulate, with the previous consent of a majority of the stockholders in general meeting convened.

12. *And be it further enacted*, That it shall be the duty of the president and directors of the Chesapeake and Ohio Canal Company, so long as there shall be and remain any creditor of the Potomac company, who shall not have vested his demand against the same in the stock of the Chesapeake and Ohio Canal Company, to pay to such creditor or creditors annually, such dividend, or proportion of the nett amount of the revenues of the Potomac Company, on an average of the last five years preceding the organization of the said proposed company, as the demand of the said creditor or creditors at this time, may bear to the whole debt of one hundred and seventy-five thousand eight hundred dollars.

13. *And be it further enacted*, That whenever the Potomac Company shall have declared its assent to the provisions of this act, in the manner hereinbefore provided, it shall be lawful for the said company to

surrender its charter, and convey, in due form of law, to the Chesapeake and Ohio Canal Company, hereby incorporated, all the property, rights, and privileges, by them owned, possessed, and enjoyed, under the same; and thereupon it shall be lawful to and for the said company, hereby proposed to be created, to accept such surrender and transfer, and to hold, possess, use, and occupy, all the said property, rights, and privileges, in the same manner, and to the same effect, as the said Potomac Company now hold, possess, and occupy the same by law; and thereupon the charter of the said Potomac Company shall be, and the same is hereby, vacated and annulled, and all the rights and powers thereby granted to the Potomac Company shall be vested in the company hereby incorporated; and it shall be the duty of the said last mentioned company, until every section of the contemplated canal shall be completed, so as to be used and enjoyed for the purposes of navigation, to keep the corresponding part of the river in a proper state for navigation, and in good order as the same now is; and in default thereof, they shall be in all things responsible, in the same manner as the Potomac Company is now responsible. And in all rivulets, streams, creeks, and rivers, required for the western section of the said Chesapeake and Ohio Canal, the same rights shall be, and are hereby, vested in the Chesapeake and Ohio Canal Company by this act, as the charter of the Potomac Company vested in the said company in relation to the waters of the Potomac, and the tributary streams thereof.

14. *And be it enacted*, That the said canal, and the works to be erected thereon in virtue of this act, when completed, shall forever thereafter be esteemed, and taken to be navigable as a public highway, free for the transportation of all goods, commodities, and produce whatever, on payment of the tolls to be imposed, as provided by this act; and no other toll or tax whatever, for the use of the said canal and the works thereon erected, shall, at any time hereafter be imposed, but by consent of the said States, and of the United States.

15. And whereas it is necessary for the making of the said canal, locks, dams, ponds, feeders, and other works, that a provision should be made for condemning a quantity of land for the purpose: *Be it enacted*, That it shall and may be lawful for the said president and directors, or a majority of them, to agree with the owners of any land, through which the said canal is intended to pass, for the purchase or use and occupation thereof; and in case of disagreement, or in case the owner thereof shall be a femme covert, under age, non-compos, or out of the state or county, on application to a justice of the county in which such land shall be, the said justice of the peace shall issue his warrant, under his hand, to the Sheriff of the county, to summon a jury of eighteen inhabitants of his county, not related to the parties, nor in any manner interested, to meet on the land to be valued, at a day to be expressed in the warrant, not less than ten, nor more than twenty days thereafter: and the sheriff, upon receiving the said warrant, shall forthwith summon the said jury, and, when met, shall ad-

minister an oath or affirmation, to every juryman who shall appear, being not less than twelve in number, that he will faithfully, justly, and impartially, value the land, and all damages the owner thereof shall sustain by cutting the canal through such land, or the partial or temporary appropriation, use, or occupation, of such land, according to the best of his skill and judgment, and that in such valuation he will not spare any person for favor or affection, nor any person grieve for malice, hatred, or ill will; and in every such valuation and assessment of damages, the jury shall be, and they are hereby instructed to consider, in determining and fixing the amount thereof, the actual benefit which will accrue to the owner from conducting the said canal through, or erecting any of the said works upon his land, and to regulate their verdict thereby; except that no assessment shall require any such owner to pay, or contribute any thing to the said company where such benefit shall exceed, in the estimate of the jury, the value and damages ascertained as aforesaid; and the inquisition thereupon taken, shall be signed by the sheriff and some twelve or more of the jury, and returned by the sheriff to the clerk or prothonotary of his county, and unless good cause be shewn against the said inquisition, it shall be affirmed by the court and recorded; but if the said inquisition should be set aside, or if from any cause no inquisition shall be returned to said court within a reasonable time, the said court may, at its discretion, as often as may be necessary, direct another inquisition to be taken, in the manner above prescribed; and, upon every such valuation, the jury is hereby directed to describe and ascertain the bounds of the land by them valued, and the quality and duration of the interest and estate in the same, required by the said company for its use; and their valuation shall be conclusive on all persons, and shall be paid for by the said president and directors to the owner of the land, or his legal representatives; and on payment thereof, the said company shall be seized of such land as of an absolute estate in perpetuity, or with such less quantity and duration of interest or estate in the same, or subject to such partial or temporary appropriation, use, or occupation, as shall be required and described, as aforesaid, as if conveyed by the owner to them. And whenever, in the construction of the said canal, or any of the works thereof, locks, dams, ponds, feeders, tunnels, aqueducts, culverts, bridges, or works of any other description whatsoever, appurtenant thereto, it shall be necessary to use earth, timber, stone or gravel, or any other material to be found on any of the lands adjacent or near thereto, and the said president and directors, or their agent, cannot procure the same for the works aforesaid, by private contract of the proprietor or owner, or in case the owner should be a femme covert, or non compos, or under age, or out of the state or county, the same proceedings in all respects shall be had as in the case before mentioned of the assessment and condemnation of the lands required for the said canal, or the works appurtenant thereto.

16. *And be it enacted*, That it shall be the duty of the company hereby incorporated, to cut, make, and construct the said canal, with

good and sufficient locks, on the most improved plan for expedition in the use thereof, and with a width of not less than forty feet at the surface of the water therein, or of twenty-eight feet at the bottom thereof, unless the quality of the soil shall require a narrow base to admit of a sufficient slope to preserve the banks from sliding down, and sufficient to admit, at all seasons, the navigation of boats and rafts, with a depth of four feet water at the least; and wherever wastes shall be essential to the security of the said canal, and in no other situation whatever, along the same, the waste water of the said canal may be, from time to time, sold or disposed of by the said company, for the purpose of supplying such works and machinery as require a water power. And along one side at least, of the said canal, and such aqueducts as it may render necessary, there shall be provided throughout its whole extent, a towing path of sufficient breadth to apply the power of horses to the navigation thereof.

17. *And be it enacted*, That it shall and may be lawful for any of the said stockholders to transfer his or her shares, by deed, executed before two witnesses, and registered, after the proof of the execution thereof, in the company's books, and not otherwise, except by devise, which devise shall also be exhibited to the president and directors, and registered in the company's books, before the devisee or devisees shall be entitled to draw any part of the profits from the said tolls or dividends: *Provided*, that no transfer shall be made, except for one or more whole share or shares, and not for part of such share or shares, and that no share or shares shall, at any time, be sold, conveyed, or held in trust, for the use and benefit, or in the name of another, whereby the said president and directors, or the stockholders of the said company, or any of them, shall or may be challenged, or made to answer concerning any such trust, but that every person appearing as aforesaid, to be a stockholder, shall, as to the others of the said company, be, to every intent, taken absolutely as such; but, as between any trustee, and the person for whose benefit any trust shall be created, the common remedy may be pursued.

18. *And be it enacted*, That if the said capital, and the other aids already granted by this act, shall prove insufficient, it shall and may be lawful for the said company, from time to time, to increase the said capital, by the addition of so many whole shares as shall be judged necessary by the said stockholders, or a majority of them, present at any general meeting of the said company: and the said president and directors, or a majority of them, are hereby empowered and required, after giving at least two months previous notice thereof, in at least four of the newspapers, printed in Virginia, Pennsylvania, Maryland, and the District of Columbia, to open books in the beforementioned States and District, for receiving and entering such additional subscriptions, in which the stockholders of the said company for the time being, shall, and are hereby declared to have the preference of all others, for the first thirty days after the said books shall be opened as aforesaid, of taking and subscribing for so many whole shares, as any of them shall choose; and the said president and directors are

hereby required to observe, in all other respects, the same rules therein, as are by this act prescribed, for receiving and adjusting the first subscriptions, and in like manner to return, under the hands of any three or more of them, an exact list of such additional subscriptions, with the sums subscribed, to the public authorities as aforesaid, to be by them preserved as aforesaid; and all stockholders of such additional shares shall, and are hereby declared to be, from thenceforward, incorporated into the said company.

19. *And be it enacted*, That, whenever it shall become necessary to subject the lands of any individual to the purposes provided for in this act, and their consent cannot be obtained, it shall and may be lawful for the company to enter upon such lands, and proceed to the execution of such works as may be requisite; and that the pendency of any proceedings in any suit, in the nature of a writ of ad quod damnum, or any other proceedings, shall not hinder or delay the progress of the work; and it shall be the duty of every court to give precedence to controversies which may arise between the company created by this act, and the proprietors of land sought to be condemned for public uses, and to determine them in preference to all other causes.

20. *And be it enacted*, That the said canal shall be, and the same is hereby, divided into two sections, to be denominated first and second, or eastern and western, respectively; that the first, or eastern section, shall begin at the District of Columbia, on tide water, and terminate at or near the bank of Savage river, or creek, which empties into the North branch of the Potomac, at the base of the Alleghany mountain; that the second, or western section, shall commence at the said termination, and extend along the valley of Savage river, or creek, so far as the same, or any branch thereof, as may reach some convenient point thereon, for connecting the eastern and western waters, by a tunnel through, or an open cut across the dividing ridge between the same, and thence, after crossing the said dividing ridge, shall proceed to the highest steamboat navigation of the Ohio river, or of some one tributary stream thereof, in such direction as, in the opinion of the said president and directors, shall be best calculated for the attainment of the end set forth in the preamble of this act: that the said president and directors shall first construct the eastern section aforesaid, out of the capital stock hereinbefore mentioned, and shall next proceed to construct, with all possible despatch, the western section thereof. In case the said company shall not begin the said work within two years after the company shall have been formed, or if the work, having been so begun, shall not be diligently prosecuted, so that one hundred miles of the said canal, with the adequate locks and incidental improvements, shall not be completed, and in fit order for navigation, in the term of five years from the commencement of the work, then all interest of the said company, in the navigation and tolls, shall cease and determine, and their charter shall be thereafter taken to be null and void; and so, in like manner shall the said charter be null and void, if the entire eastern section be not completed in the term of twelve years from the said commencement. And should the said

company fail to begin the western section of the said canal, in two years after the time allowed as aforesaid for the completion of the eastern section; or, having begun the western section, shall fail to complete the same, in six years after such beginning, then all right, title, and interest, of the said company, in the said western section, shall cease and determine: and the several states aforesaid shall have full authority to incorporate another company for the completion of such section, or to complete the same in any other mode that they may deem expedient. And if, after the completion of the said canal and locks, the president and directors shall fail to keep the same in repair for twelve months at any time, then, in like manner, the interest of the company in the navigation and tolls shall cease, and their charter shall be forfeited.

21. *And be it further enacted*, That the right to the waters of the river Potomac, for the purpose of any lateral canal or canals, which the State of Virginia or Maryland may authorize to be made in connection with the said canal, is reserved to the said States, respectively; that a similar right is reserved to the State of Pennsylvania in relation to the rivers and streams within the territory of that State, the waters of which may be used in supplying the western section of the said canal; that the Government of the United States shall retain the power to extend the said canal in or through the District of Columbia, on either or both sides of the river Potomac: *Provided*, That before this act shall take effect, the Congress of the United States shall authorize the States of Virginia and Maryland, or either of them, to take and continue a canal from any point of the above named canal, or the termination thereof, through the territory of the District of Columbia, or any part thereof, to the territory of the said States, or either of them, in any direction they may deem proper, upon the same terms and conditions, and with all the rights, privileges, and powers, of every kind whatsoever, that the company incorporated by this act have to make the Chesapeake and Ohio Canal: *And provided, also*, That, in taking or extending such lateral canal or canals through the District of Columbia, by either of the said States, no impediment or injury be done to navigation of the said Chesapeake and Ohio Canal.

22. This act, or so much thereof as respects the canal and works designated to be constructed in the District of Columbia, and the States of Virginia and Maryland, shall take effect, with such necessary modification in the construction thereof, as shall fit it for such limited application or use upon the assent of the Congress of the United States and the Legislature of Maryland being given thereto; and upon its receiving the further assent of the Legislature of Pennsylvania, the whole, and every section and part thereof, shall be valid and in full force and operation.

23. *Be it further enacted*, That the assent of the Congress of the United States, required by the first section of this act, and the authority conferred by the fourteenth section, is understood and taken to relate only to their authority as the Legislature of the District of Columbia.

24. *Be it further enacted*, That all acts and parts of acts coming within the purview of this act, shall be, and the same are hereby, repealed.

RICHMOND, *Dec.* 30*th*, 1824.

The foregoing is a true copy of an act of the General Assembly of Virginia.

WM. MUNFORD,
Keeper of the Rolls.

AN ACT to amend the act, entitled "An act incorporating the Chesapeake and Ohio Canal Company," passed the 27th of January, 1824.

Whereas it appears to this General Assembly, that, in the proviso to the fifth section of the act, entitled "An act incorporating the Chesapeake and Ohio Canal Company," passed the 27th day of January, 1824, the following words, destructive of the intent and operation of the said section, have been inserted, to wit: "nor any payment demanded within any year from the commencement of the work:"

Be it therefore enacted, by the General Assembly of Virginia, That, so soon as the Legislatures of Maryland and Pennsylvania, and the Congress of the United States, as the Legislature of the District of Columbia, shall assent to this act, the words above quoted shall be repealed and expunged from the aforesaid proviso: and thenceforth the said proviso shall be construed in the same manner, and have the same effect, as if the aforerecited words had never been inserted therein.

I hereby certify that the foregoing is a true copy of an act passed during the present session of the Legislature of Virginia.

Given under my hand, (there being no seal of office,) this 30th day of January, 1826.

GEORGE W. MUNFORD,
Keeper of the Rolls for the State of Virginia.

ACT OF THE STATE OF MARYLAND.

AN ACT to confirm an act of the General Assembly of the State of Virginia, entitled "An act for incorporating the Chesapeake and Ohio Canal Company."

Whereas the General Assembly of Virginia have heretofore, at the December session of the said General Assembly, in the year eighteen hundred and twenty-three, passed an act, entitled "An act incorporating the Chesapeake and Ohio Canal Company," in the substance, or words following:

[*See the preceding act.*]

Therefore, be it enacted by the General Assembly of Maryland, That the said act of the General Assembly of Virginia be, and the same is hereby, accepted, assented to, and confirmed.

And be it further enacted and declared, That, by confirming and accepting the act of Virginia, it is not intended by the Legislature of Maryland to deny to the Congress of the United States the constitutional power to legislate on the subjects of roads and canals. And for the purpose of removing all doubt as to the right of the State of Maryland to intersect the said Chesapeake and Ohio Canal, for the purpose of conducting a lateral canal or canals to Baltimore, or elsewhere in the State of Maryland, from that part of the said Chesapeake and Ohio Canal which shall be within the District of Columbia—

Be it further enacted and declared, That the said act of Virginia has been accepted and confirmed by the Legislature of Maryland, on the express condition that the act of Congress contemplated by the twenty-first section of the Virginia act, shall direct and provide some safe and practicable mode whereby such lateral canal or canals may be secured to the State of Maryland, and whereby, also, it may be determined whether such lateral canal or canals will injure the said Chesapeake and Ohio Canal. within the meaning and intention of the said twenty-first section of the Virginia act.

We hereby certify, that the foregoing is a true copy of the original act, as passed both branches of the Legislature, at December session, eighteen hundred and twenty-four.

WM. KILTY, *Clk. Senate of Md.*
JOHN BREWER, *Clk. House Del.*

Annapolis, Jan. 31, 1825.

ACT OF THE CONGRESS OF THE UNITED STATES.

An act confirming an act of the Legislature of Virginia, entitled "An act incorporating the Chesapeake and Ohio Canal Company," and an act of the State of Maryland, confirming the same.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the act of the Legislature of the State of Virginia, entitled "An act incorporating the Chesapeake and Ohio Canal Company," be, and the same is hereby, ratified and confirmed, so far as may be necessary for the purpose of enabling any company that may hereafter be formed by the authority of said act of incorporation, to carry into effect the provisions thereof, in the District of Columbia, within the exclusive jurisdiction of the United States, and no further.

SEC. 2. *And be it further enacted,* That, should the State of Virginia or Maryland desire, at any time, to avail itself of the right secured to it by the twenty-first section of the act aforesaid, to take and continue a canal from any point of the Chesapeake and Ohio Canal, to any other point within the territory of the District of Columbia, or through the same, on application to the President of the United States,

by the Executive of the State, the President is authorized and empowered to depute three skilful Commissioners of the United States' Corps of Engineers, to survey and examine so much of the route of such canal as may affect, in any manner, the navigation of the Chesapeake and Ohio Canal. The said Commissioners, or a majority of them, shall ascertain, as far as practicable, whether the canal proposed to be constructed by the State aforesaid, will injure or impede the navigation of the Chesapeake and Ohio Canal, and report to the President of the United States the facts and reasons on which they may ground their judgment thereupon; which report shall be submitted to the Congress of the United States at their session next ensuing the date thereof, for their decision thereon; and if Congress shall be of opinion that the said canal may be cut in the manner proposed as aforesaid, without impeding or injuring the navigation of the Chesapeake and Ohio Canal, the same shall be conclusive thereon.

H. CLAY,
Speaker of the House of Representatives.
JOHN GAILLARD,
President of the Senate, pro tempore.

WASHINGTON, *March* 3, 1825.—Appoved:

JAMES MONROE.

PROCEEDINGS OF THE GENERAL MEETING OF THE POTOMAC COMPANY.

GEORGETOWN, D. C. 16*th May*, 1825.

At a special meeting of the stockholders of the Potomac Company, held this day at Semmes' Tavern, previous notice thereof having been given conformably to law—

The following resolutions were unanimously adopted:

That this meeting, having duly considered the act of the General Assembly of the State of Virginia, passed at the December session thereof, in the year 1823, entitled "An act incorporating the Chesapeake and Ohio Canal Company," and the acts of the General Assembly of Maryland, and of the Congress of the United States, confirming the same, and being willing and desirous that the charter shall be granted and confirmed to the said Chesapeake and Ohio Canal Company, do hereby declare the full and free assent of the Potomac Company to the said act incorporating the said Chesapeake and Ohio Canal Company, and to all the provisions thereof.

That the President of the Potomac Company be, and he is hereby, required to deliver to the Executives of the States of Virginia, Maryland, and Pennsylvania, respectively, and to the Secretary of the Treasury of the United States, copies of the aforegoing declaration of

assent and corporate act of the Potomac Company, as required by the 1st section of the act of the General Assembly of Virginia, entitled "An act incorporating the Chesapeake and Ohio Canal Company."

That the President and Directors of the Potomac Company be, and they are hereby, authorized and required, in the name and behalf of this company, whenever, agreeably to the terms and provisions of the aforesaid act of Virginia, entitled "An act incorporating the Chesapeake and Ohio Canal Company," the subscribers therein mentioned and referred to, shall have become incorporated, to make a surrender of the Charter of the Potomac Company, to the said Chesapeake and Ohio Canal Company, and to convey in due form of law to the said Chesapeake and Ohio Canal Company, all the property, rights, and privileges, owned, possessed, and enjoyed, by the said Potomac Company, under their said charter, to be held, used, and occupied, by the said Chesapeake and Ohio Canal Company, in the same manner and to the same effect, as the said Potomac Company now hold, possess, and occupy the same by law. And it is hereby resolved and declared, that, upon the completion of the said surrender and conveyance by the said President and Directors, to be evidenced by deed or deeds, in the name of this Company, under the hands of the said President and Directors, or a majority of them, and the corporate seal of this Company, the said charter shall be, and hereby is, effectually surrendered, and all the said property, rights, and privileges, shall be, and hereby are, effectually conveyed to the said Chesapeake and Ohio Canal Company, according to the tenor and effect, true intent and meaning, of the said act and acts so incorporating the Chesapeake and Ohio Canal Company, as aforesaid.

In testimony whereof, the corporate act as the Potomac Company, &c.

OFFICE OF THE POTOMAC COMPANY,
Georgetown, 16th May, 1825.

I hereby certify the aforegoing to be a true and faithful extract from the records of the proceedings of the Potomac Company.

ROB'T BERNARD,
Treas. and Cl'k Poto. Com.

Extracts from the Charter of Potomac Company.

Granted November, 1784.

Sec. 4. *And be it enacted,* That the said President and Directors, so elected, and their successors, or a majority of them assembled, shall have full power and authority to agree with any person or persons, on behalf of the said Company, to cut such canals, and erect such locks, and perform such other works as they may judge necessary, for opening, improving, and extending the navigation of the said ri-

ver, above tide water, to the highest part of the North Branch, to which navigation can be extended, and carrying on the same from place to place, and from time to time and upon such terms, and in such manner, as they shall think fit: and out of the money arising from the subscriptions and the tolls, and other aids hereinafter given, to pay for the same; and to repair and keep in order the said canals, locks, and other works, necessary thereto.

Sec. 11. And whereas it is necessary for the making of the said canal locks, and other works, that a provision should be made for condemning a quantity of land for the purpose: *Be it enacted*, That it shall and may be lawful for the said President and Directors, or a majority of them, to agree with the owners of any land through which the said canal is intended to pass, for the purchase thereof; and, in case of disagreement, or in case the owner thereof shall be a *femme covert*, under age, *non compos*, or out of the State, on application to any two justices of the county in which such land shall lie, the said justices shall issue their warrant, under their hands, to the sheriff of their county, to summon a jury of twenty-four inhabitants of their county, of property and reputation, not related to the parties, nor in any manner interested, to meet on the land to be valued, at a day to be expressed in the warrant, not less than ten, nor more than twenty days thereafter; and the sheriff, upon receiving the said warrant, shall forthwith summon the said jury; and, when met, shall administer an oath, or affirmation, to every juryman that shall appear, that he will faithfully, justly, and impartially, value the land, (not exceeding in any case, the width of two hundred feet) and all damages the owner thereof shall sustain, by the cutting the canal through such land, according to the best of his skill and judgment; and that, in such valuation, he will not spare any person for favor or affection, nor any person grieve for hatred, malice, or ill will; and the inquisition thereupon taken shall be signed by the sheriff, and some twelve or more of the jury, and returned by the sheriff to the clerk of his county, to be by him recorded: And, upon every such valuation, the jury is hereby directed to describe and ascertain the bounds of the land by them valued, and their valuation shall be conclusive on all persons, and shall be paid by the said President and directors to the owner of the land, or his legal representative: and, on payment thereof, the said Company shall be seized *in fee* of such land, as if conveyed by the owner to them and their successors by legal conveyance.

Sec. 12. *And be it enacted*, That the said President and Directors, or a majority of them, are hereby authorized to agree with the proprietor, for the purchase of a quantity of land, at or near such of the place of receipt of tolls aforesaid, for the purpose of erecting necessary buildings; and in case of disagreement, or any of the disabilities aforesaid, or the proprietor being out of the state, then such land may be valued, condemned, and paid for as aforesaid, for the purpose aforesaid; and the said company shall, upon the payment of the valuation of the said land, be seized thereof *in fee simple*, as aforesaid.

Sec. 13. And whereas some of the places through which it may be

necessary to conduct the said canals, may be convenient for erecting mills, forges, or other water works, and the persons, possessors of such situation, may design to improve the same; and it is the intention of this act not to interfere with private property, but for the purpose of improving and perfecting the said navigation: *Be it enacted,* That the water, or any part thereof, conveyed through any canal or cut made by the said Company, shall not be used for any purpose but navigation, unless the consent of the proprietors of the land, through which the same shall be led, be first had.

Brief description of the Works executed by the Potomac Company, with the lockage and command of water thereon.

The Potomac Company, in pursuance of the powers granted to them, by their charter, have executed the following works :

1st. Large canals taken out of the river Potomac, and conveyed through locks around the principal Falls. Of these, the chief are the works of the Great Falls, where the difference of level, 76 feet 9 inches, is surmounted by a series of 5 sets of looks, of solid masonry of stone, each 100 feet in length, of the various width of from 10 to 14 feet ; of the lift of from 10 to 18 feet ; and of the cubical contents of from 18,000 to 25,000 feet ; a set of guard-locks, and extensive basin. And a canal, in length 1200 yards, lined with walls of stone. Of the lock seats, the two lower pair have been excavated entirely from the solid rock, and exhibit an imperishable monument of perseverance and skill.

At this situation, the Potomac Company have acquired, in *fee simple,* 16 acres of land, at an uniform width of 140 feet, for the location of the canal and locks, and 1 acre further, for the erection of necessary buildings.

At the Little or Lower Falls, the difference of level, 37 feet 1 inch, is surmounted by a series of 4 sets of locks, of solid masonry of stone, of the dimensions of 80 feet in length, and 12 feet in width ; and by a canal 2½ miles long, on the margin of which are found inexhaustible supplies of excellent and valuable stone, for building purposes ; all which are within the land acquired by the Company, *in fee simple.* The quantity of land so possessed here by the Company, is 53 acres and 3 roods, at a constant width of 180 feet, and also one acre for the erection of necessary buildings.

The canals at both the Great and Little Falls, are excavated of the following dimensions :

25 feet wide at surface
20 " " bottom
4 " deep

2d. Works, erections of walls, and excavations in the body of the river, in order to confine the passages of the water within canals, of widths varying from 16 to 25 feet.

Dams of stone run across the river, leaving openings or sluices of similar widths ; by which the water was raised in the river above them.

Removals of large stones and masses of rock, which presented obstacles to the passage of boats in the various channels of the river.

Similar to these were works executed on the Monocacy, Antietam, and Conogocheague Rivers, and very extensive operations upon the Shenandoah.

Under the improved mode of modern navigation by independent canals, the 2nd class of works, erected at enormous expense, at a time when such operations were completely new in the United States, and in the absence of that experience which modern times have derived from the enlargement of scientific research, and the now constant application of practical skill in works of civil engineering, have been found to be entirely useless. And the property, rights, and privileges, of the Potomac Company, in and upon the river Shenandoah, have been by them long since conveyed, for certain considerations, to the Shenandoah Company—who now enjoy the same.

Commissioners appointed by the President of the United States, and the Governors of Maryland and Virginia, to open books for subscriptions to the Stock of the Chesapeake and Ohio Canal.

By the President—

SAMUEL H. SMITH,
ANTHONY C. CAZENAVE,
CLEMENT SMITH.

By the Governor of Maryland—

SAMUEL SPRIGG,
PHILIP E. THOMAS,
FRISBY TILGHMAN.

By the Governor of Virginia—

WILLIAM ELLZEY,
RICHARD H. HENDERSON,
JOHN C. HUNTER.

A ***GENERAL TABLE*** *of the quantities of the various articles and produce, which have been brought from the upper country of the Potomac to tide water; the estimated value thereof; the tonnage employed in transporting the same; and the tolls collected thereon, from the 1st August, 1799, to 1st August, 1824.*

Y'rs ending Aug	Flour. Barrels.	Whiskey. Barrels.	Tobacco. Hhds.	Iron. Tons.	Other articles. Estimated value.	Return goods Estimated value.	Total estimated value.	Number of Boats	Tonnage.	Tolls collected.
1800	16,584	84	25	- -	$ 2,950	$7,8 1	$129,414	296	1,643	$ 2,138 58
1801	28,209	619½	100	187½	14,060	6,180	328,445	413	2,993	4,210 19
1802	17,250	379	5	238½	27,233	- -	163,916	305	1,952	3,479 69
1803	45,055	257	32	48½	3,936	10,386	345,473	493	5,549	9,353 93
1804	39,350	578	8	88	3,250	7,514	284,041	426	3,823	7,765 58
1805	28,507	436	11	137	32,975	7,486	340,334	405	3,203	5,213 24
1806	19,079	459	5	20½	3,553	4,998	86,790	203	1,226	2,123 69
1807	85,248	971	20	35	11,796	7,314	551,896	573	8,155	15,080 42
1808	48,463	1,535	3	13	10,532	7,613	337,008	508	5,994	9,924 27
1809	40,039	1,527	37	494	8,537	11,510	305,628	603	6,767	9,094 89
1810	40,757	1,080	13	191½	5,703	- -	318,238	568	5,374	7,915 85
1811	118,222	3,768	27	200	6,810	6,000	925,075	1,300	16,350	22,542 89
1812	55,829	3,143	6	360	1,694	7,320	515,526	613	9,214	11,471 37
1813	55,902	3,464	11	252	1,899	6,119	423,340	623	7,916	11,816 22
1814	38,769	2,684	18	361	676	5,314	311,[illegible]94	596	5,987	9,109 82
1815	47,183	4,616	9	314	2,075	5,211	489,498	613	6,354	9,789 57
1816	35,918	1,774	29	419	9,292	6,371	357,661	550	6,152	7,501 52
1817	57,662	1,385	10	335	4,094	14,000	787,994	856	8,197	13,948 23
1818	58,226	3,126½	2	428¾	8,750	15,124	681,925	746	9,778	10,332 26
1819	66,542½	1,479	- -	278½	9,988	15,521	565,011	775	7,550	12,514 04
1820	75,272	1,215	14	227½	16,588	12,230	420,818	917	16,506	13,107 31¼
1821	67,557	1,391	10	115	11,517	16,027	318,810	760	11,400	12,490 61
1822	50,138	2,416½	31½	300	17,245	6,508	369,523	782	11,730	11,103 50½
1823	28,542½	1,331	39	445½	12,125	3,726	246,465	414	6,210	6,238 85
1824	47,599	2,738	55	564	13,512	3,562	331,641	662	9,546	9,857 13½
Total	1,211,903	42,456½	520½	6,485¼	$240,788	$187,886	$9,935,564	15,000	179,554	$238,117 66¼

NOTE *to the preceding page.*—The apparent small amount of tolls heretofore received, and the variation of receipts of different years, are to be accounted for by the circumstance, that the present works, and attempted improvements in the bed of the river, can be only periodically used for navigation, when the prevalence of rains, or the melting of the winter snows, produce a very considerable rise in the waters of the Potomac.

Extracts from the Act of the State of Maryland, for the Promotion of Internal Improvement; passed March 8, 1826.

SEC. 19. *And be it enacted,* That the Treasurer of the Western Shore be, and he is hereby, authorized and required, for and on behalf of the State, to subscribe to the Chesapeake and Ohio Canal Company for stock to the whole amount of the stock of the Potomac Company owned by the State, and of the debt due to the State by the said Potomac Company, and to pay for the same in the certificates of the stock of the Potomac Company, and in the evidences of the debt due to the State, certified in the manner specified in the charter of the said Chesapeake and Ohio Canal Company; and also to subscribe for five thousand shares of the stock of the said company, payable agreeably to the terms of the charter in the legal currency of the United States.

SEC. 20. *And be it enacted,* That the Treasurer of the Western Shore be, and he is hereby, instructed and required, in like manner, to subscribe for five thousand shares in the Maryland Canal Company hereby incorporated.

SEC. 21. *And be it enacted,* That the sum of two hundred thousand dollars shall be, and the same is hereby, appropriated, or such part thereof as may be necessary, to drain, embank, and render dry and arable, the low lands on the margins of such rivers and creeks of the Eastern Shore of this State as the Board of Public Works may think proper and recommend, and to complete and carry into effect such plans for opening and improving the navigation of the Pokomoke, Manokin, Wicomico, Great Choptank, Chester, Elk, and North East rivers, as the Board of Public Works may devise, recommend, and contract for on behalf of the State of Maryland: *Provided,* That, before any part of the aforesaid subscriptions, except so much as is payable in the stock and debt of the Potomac Company, shall be made, or any part of the sum herein appropriated to execute the improvements contemplated by this act to be made, on the low lands situated on the margins of the aforesaid rivers and creeks, or to execute the improvements of the Pokomoke, Monokin, Wicomico, Greak Choptank, Chester, Elk, and North East rivers be expended, the Congress of the United States shall, by law, authorize a subscription for not less than ten thousand shares of the capital stock of the Eastern section of the Chesapeake and Ohio Canal, and shall enact a law ex-

pressly securing to the State of Maryland, and to any company incorporated, or hereafter to be incorporated by the said State, the right to take and continue a canal from any point of the Chesapeake and Ohio Canal through the Territory of Columbia, or any part thereof to the said State, in any direction it may deem proper, upon the same terms and conditions, and with all the rights, privileges, and powers, of every kind whatsoever, granted to the Chesapeake and Ohio Canal Company by the act of incorporation, and deciding agreeably to the act of Congress passed at December session, eighteen hundred and twenty-four, that the canal, as located by the Board of Public Works under the authority of this act, may be cut without impeding or injuring the navigation of the Chesapeake and Ohio Canal. *And provided also,* That the Board of Public Works shall previously ascertain and certify to the Executive the practicability of connecting, by the canal described in this act, the Chesapeake and Ohio Canal with the Patapsco River at the city of Baltimore; and if the said Board of Public Works shall adopt for the said canal a line wholly within the State of Maryland, then the act of Congress last mentioned in the foregoing proviso, shall not be necessary to authorize the subscriptions and expenditures aforesaid: *And provided also.* That the Executive shall previously be satisfied that the residue of the sum of money estimated by the United States Board of Engineers to be adequate to the completion of the eastern section of the Chesapeake and Ohio Canal, after deducting the amount of the subscriptions of the State of Maryland and of the United States herein provided to be made, hath been actually subscribed by bona fide and competent subscribers.

ACT OF THE STATE OF PENNSYLVANIA.

An Act incorporating the Chesapeake and Ohio Canal Company.

SECTION 1. *Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same.* That the full and entire assent of this Commonwealth be, and the same is hereby, given to all and each of the provisions, mentioned and contained in an act of the legislature of the State of Virginia, passed the twenty-seventh day of January, one thousand eight hundred and twenty four, entitled "An act incorporating the Chesapeake and Ohio Canal Company," so far as the same are or may be applicable to this Commonwealth; and the said act of the State of Virginia, is hereby adopted, ratified, and confirmed, and enacted into a law of this Commonwealth, and all and each of the provisions, conditions, and restrictions thereof, as fully and effectually, as if the same were enacted, paragraph by paragraph, and section by section, so far as the same can apply to this Commonwealth; always, nevertheless, subject to the exceptions, provisions, and restrictions, hereinafter mentioned: and the said act shall hereafter be in

full force and effect, wherever the same is applicable, as well within, as without this Commonwealth, as an act incorporating the Chesapeake and Ohio Canal Company, for all and every of the objects and purposes therein set forth and provided for, according to the true intent and meaning of the said act of the State of Virginia; an exemplification whereof, shall be annexed to this act, and be published in the same manner as the laws usually are published; and the Governor shall likewise cause an exemplified copy of the said act of Virginia to be deposited in the secretary's office of this Commonwealth, and shall also transmit an attested copy of this act to the President of the United States, and one copy thereof to the Governor of Virginia, and one copy thereof to the Governor of Maryland.

SECTION 2. *And be it further enacted by the authority aforesaid*, That this act shall have no effect, unless, within three years from and after the passage hereof, the State of Maryland shall pass a law authorizing the State of Pennsylvania, or any company which may be for that purpose incorporated by the State of Pennsylvania, to take and continue a lateral canal or canals, or a rail way, from any point or points within the territory of Pennsylvania, to, and connect with the Chesapeake and Ohio Canal within the territory of the said State of Maryland, upon the same terms and conditions, and with all the rights, privileges, and powers, of every kind whatsoever, that the Chesapeake and Ohio Canal Company may have to make the said Chesapeake and Ohio Canal, and unless the said Chesapeake and Ohio Canal Company shall assent to and accept the said law of the State of Maryland, within one year after it shall have been enacted: *Provided*, That, should the said Chesapeake and Ohio Canal be located on the south side of the Potomac, at any point or points below the town of Hancock, then the assent of Virginia, and the said Chesapeake and Ohio Canal Company shall also be obtained in like manner, before this act goes into operation, except so far as it requires the assent of Maryland to the right to make a railway through the territory of that State.

SEC. 3. *And be it further enacted by the authority aforesaid*, That as a condition on which this act shall pass, no greater tolls shall be charged or paid on goods, commodities, and produce, entering and transported on the said Chesapeake and Ohio Canal, from such lateral canals, than are charged and paid on other goods, commodities, and produce, of the same kind, transported on the said Chesapeake and Ohio Canal: *And provided further*, That the aforesaid Chesapeake and Ohio Canal Company shall extend the Chesapeake and Ohio Canal to, and terminate the same at, the city of Pittsburg.

SEC. 4. *And be it further enacted by the authority aforesaid*, That the said Chesapeake and Ohio Canal Company shall have full power and authority to alter and change the route of the western section of the said canal so that the same may commence at the town of Cumberland, situated near the junction of Wills creek, with the north branch of the Potomac, and be continued from thence by the valley of Wills creek, and Casselmen's river, to the Youghiogeny, and from thence to the city of Pittsburg: *Provided*, That the United

States' Board of Internal Improvement, or a majority thereof, should deem and report that route to be the best.

SEC. 5. *And be it further enacted by the authority aforesaid.* That, should the United States of America subscribe to the stock of the said Chesapeake and Ohio Canal Company, the said company shall, within six months after receiving the sum subscribed, commence the western section of said canal, at such point or points as may be deemed most advantageous to the interests of the said company; and it shall be their duty to apportion at least one half of the subscription of the United States to the western section of the said canal. And whatever amount of stock may be subscribed by the citizens of Pennsylvania, shall be expended wholly on the western section, unless authority is given to the said company, by the Pennsylvania subscribers, to expend their subscriptions differently; and, in case of failure of the said company to comply with the provisions herein set forth, this act shall cease to have any force or effect whatever.

SEC 6. *And be it further enacted by the authority aforesaid,* That if the nett annual dividend of said company shall, for any two years in succession, exceed the amount of fifteen per cent. such excess shall be equally applied by the president and directors, to the accommodation of the inhabitants of the shores of the Youghiogeny and Monongahela rivers, and of the country drained by the tributary streams thereof, now navigable, or which may hereafter become so, in the same manner, in proportion to the distance, as is directed for the accommodation of the inhabitants of the shores of the Potomac, and its tributary streams, by the eleventh section of an act of the State of Virginia, entitled "An act incorporating the Ohio and Chesapeake Canal Company," passed the twenty-seventh day of January, one thousand eight hundred and twenty-four.

SEC. 7. *And be it further enacted by the authority aforesaid,* That it shall and may be lawful for the said Chesapeake and Ohio Canal Company, at any place within this Commonwealth, on the route of the said canal, to sell or lease the use of the water contained therein, or in any embankment, dyke, pond, or other improvement, connected therewith, to any individual or individuals, or private company or companies, for that purpose incorporated by the State of Pennsylvania, for mills, or any other water works, or for irrigating any lands, or for suppplying bleach grounds, tan pits, or brick yards, and the profits or rents resulting therefrom, to take and receive to, and for the use and benefit of, the said corporation, in addition to the tolls and profits allowed to be taken by the act of Virginia: *Provided,* That the navigation of the said canal be not thereby impeded or obstructed: *And, provided further,* That the said Chesapeake and Ohio Canal Company shall not at any time be directly or indirectly engaged or concerned in any banking, merchandising, milling, or the erecting of mills, manufacturing or mining, or in any other business whatsoever, except such as may be necessary and proper for the construction of such canal and appurtenances, and the performance of the several functions of a canal company.

SEC. 8. *And be it further enacted by the authority aforesaid,* That, as a further condition on which the assent of this State is given to the Virginia act, aforesaid, that, so far as regards the territory of Pennsylvania, whenever the said canal shall cross any public or private laid out road or highway, or shall divide the ground of any person or persons, so as to inquire a ford or bridge to cross the same, the jury, who shall require of the damages to be sustained, in manner directed by the fifteenth section of the Virginia act, shall find and ascertain whether a passage across the same shall be admitted or maintained by a ford or bridge; and on such finding, the said Ohio and Chesapeake Canal Company shall cause a ford to be rendered practicable, or a bridge fit for the passage of carts and wagons to be built, and forever hereafter maintained and kept in repair, at all and every places so ascertained by the said jury, at the costs and charges of the said company; but nothing herein contained shall prevent any person from erecting and keeping in repair, any foot or other bridge, across the said canal, at his own expense, when the same shall pass through his ground: *Provided,* The same shall be of such height above the water, as shall be usual in the bridges erected by the company: *And, provided also,* That such foot or other bridges, so to be erected by the owners of such lands, shall not interfere with any of the locks, buildings, or other works of the company, or with the navigation of the said canal.

SEC. 9. *And be it further enacted by the authority aforesaid,* That the assent of the Legislature of this Commonwealth, to the said act of the Legislature of Virginia, is given and granted, upon the further express conditions, that any mesne process which may be issued against the said company, may be served on any toll gatherer, director, or other officer of the company; and such service shall be held good, valid, and effectual, as a service of such process upon the said Ohio and Chesapeake Canal Company; and that said company shall annually report to the Legislature of Pennsylvania the progress they may make in constructing the said canal; and also an annual abstract of their accounts, certified by the oath of the president of the said company, showing the amount of capital stock actually paid in, and the sums deposited with the treasurer for contingent and current expenses, and the profits which may have accrued, and the dividends made or declared during the preceding year.

The following letters are from the pen of General Abner Lacock, late a Senator in Congress from Pennsylvania, a gentleman of great practical knowledge and general intelligence, who, it will be seen, devoted much time and attention to the subject. In the calculations, &c. he was assisted by David Shriver, Jr. Esq. late of the United States' Board of Internal Improvement.

No. I.

TO THE EDITORS OF THE INTELLIGENCER.

The growth and improvement of the City of Washington have not been equal to the expectations of the Nation, and its tardy progress to importance is a subject of considerable mortification to its friends. It is beautifully and advantageously situated next the highest point of tide water navigation. affording facilities of communication with the upper country, and great Western waters, superior to any other situation in the United States: and, notwithstanding those advantages, some parts of the city remain stationary at least. These observations apply themselves, it is true, more strongly to what we call Capitol Hill, than the rest of the city. This favorite spot, recommended by its beautiful and elevated situation, has been selected, and on which has been erected the public buildings for the accommodation of the National Legislature. No pains have been spared, nor money withheld, that was thought necessary to ornament and adorn, as well as to render convenient and comfortable, the public edifices, and grounds adjoining. But the Architect plans and executes in vain. Turn but your eyes from this favorite spot, and nothing like active or commensurate improvement presents itself. The great and peculiar advantages of situation which the City of Washington possesses, afford the means of prosperity and greatness, if these advantages are improved by enterprize. This I shall be able to shew in the course of the remarks which I ask leave to offer.

What forbids this place becoming a commercial and manufacturing city? The same means employed here that have been employed in a thousand other places, with very inferior natural advantages, will produce the same or greater results. Washington is more than one hundred miles nearer the navigation of the Ohio river than Philadelphia; and, in this respect, has greatly the advantage of Baltimore. The tides of the Potomac river waft the treasures of the world into the store-houses on its banks; and its current above the tide has cut its way through rocks and mountains, presenting an inclined plane on which it glides for two hundred and forty miles. From the tide water in the Potomac, it is one hundred and eighty-eight miles, by water, to Cumberland; from that place to Brownsville, on the Monongahela river, there is now completed by the United States a free turnpike road of the most superior construction. From Brownsville to Pittsburgh, by water, is about sixty miles; the stream is large and gentle, without rocks, shoals, or a single island. Thirty thousand dollars have been appropriated, by the State of Pennsylvania, to improve its

navigation, and fifteen thousand dollars, to improve the navigation of the river Ohio below Pittsburg, about forty miles to the Virginia line. This money, well applied, it is believed, will provide a steamboat navigation at all times to Brownsville; and from that place it is seventy-two miles, by the turnpike, to Cumberland on the Potomac.

Thus we find, from the city it is two hundred and sixty miles to the Monongahela river; seventy-two miles of the distance a free turnpike road, and one hundred and eighty-eight miles of water communication by the Potomac, river *to connect the National Metropolis with the great Western waters.* These general views being taken, we are enabled to appreciate the local situation of the city; and it will be seen, by comparison, that no situation in the Union can be selected, combining equal advantages. But, to enjoy those benefits, and secure those advantages, in their full extent, a canal, or slack water navigation, must be made from the tide water, in the Potomac, to Cumberland, at the foot of the mountain. This done, and the citizens of Washington would feel no alarm for themselves, if the Seat of Government should be removed the next day; it would not check their growth, nor retard their progress to future greatness.

The next subject of inquiry is the practicability of this improvement, and the probable expense necessary to be incurred in its completion. It is truly an unfortunate circumstance, that so many abortive attempts have been made in different parts of the United States in the construction of canals, and so much money misapplied by dishonest or unskilful undertakers. In consequence of these blunders, the confidence of our citizens seems to be much impaired, and the construction of a canal considered a visionary project. But the fact is, there is neither difficulty nor mystery in such an undertaking. Let us discard this talismanic word, canal, and call it a long mill-race, and all its terrors vanish: every body is familiar with mill-races, and every body has seen the water, after being carried a distance in the race, applied to turn the mill. All this appears very simple, and yet, in reality, it is much more difficult in its construction than canals and locks. But, independently of all other improvements of this nature in the United States, now in successful operation, the progress made in the New York canal, many miles of which are completed, must convince the most incredulous of the ease, cheapness, and certainty, with which such improvements can be made.

Of the precise sum for which the Potomac canal could be made, per mile, it is not possible, without a survey of the route, to determine. The estimates for the New York canal were about $13,000 per mile; but, from what has already been completed, it is found that the estimate was considerably too high, and the work has been done for a less sum; and, by comparing the price per mile of this work with former estimates, and the expense of other* canals, the writer feels

* This estimate is high—a canal or mill-race at the Little Falls, and through ground equally difficult with any part of the route, calculated according to its dimension, cost less. Information upon this point, obtained from the owner. Since which, there is a deduction of at least 33⅓ per cent. in the price of labor.

justified in stating his belief that 12,500 dollars per mile would be a high estimate for the completion of the Potomac navigation. Should the accuracy of this estimate, or those that follow, be doubted, individuals are invited to make and present their own.

It is proposed to make the canal 32 feet wide on the surface water line, and 24 feet at the bottom, and four feet deep. Those, particularly, who are acquainted with digging mill races, and their cost, will be enabled to estimate the expense of such an undertaking: and, it will be recollected, that the route of the proposed canal will follow the river Potomac in its course, and occupy its bottoms, which, being alluvial earth, is easily removed with the spade, without the labor of digging; and it is stated by those best acquainted with the nature of the ground on this stream, that not more than one-eighth part of the distance will present a broken or rocky surface; and, if this be the fact, the above estimate will be found much too high. But, we will pursue the subject on the estimate of 12,500 dollars per mile, which includes the expense of the lockage, at 1,000 dollars per foot, for each foot that Cumberland is found elevated above the level of the tide.* The length of the canal is 188 miles, which, multiplied by 12,500 dollars, gives 2,350,000 dollars. But, for the sake of greater certainty, let us add, for contingencies, and to cover every possible error in the calculation, 150,000 dollars, making the round sum of two millions and a half of dollars for the entire expense of this great improvement. Having thus completed the work, let us now proceed to test its usefulness; and, as the above estimates are made on a scale of expense above what it is believed the work will cost, the profits of the canal shall be estimated as far below, with a determination on the part of the writer not to mislead himself nor the public.

Proposed saving to the District of Columbia in the article of fuel, by means of a canal.—If we expect in the City of Washington to promote commerce, to establish manufactures, and give encouragement to tradesmen of the different kinds to settle there, we must, as much as possible, diminish the expense of maintaining a family, and procuring the means of a comfortable subsistence; and the principal expense now encountered there is in the exorbitant price of fuel. A citizen of the District, the other day, put into my hands the following estimate: He supposes the number of families in the District of Columbia that buy their fuel, are about 4000, and that each of those families consume 25 cords of wood, per annum, making 100,000 cords of wood. He also estimates the average cost of each cord, including hauling and sawing, at $6 25 cents per cord; thus making the yearly expenditure for wood in the District, amount to the enormous sum of 625,000 dollars. The same person states that, from experiments made by himself, he has found that Richmond stone coal, at 37½ cents per bushel, was as cheap fuel as wood at the price stated, (6 dollars 25 cents per cord.) Thus we find that 17 bushels of coal is about equal to a cord of wood; and if, instead of the 100,000 cords of wood consumed,

* This is Mr. Gallatin's estimate, and is now considered too high.

we substitute its equivalent in coal, and multiply 100,000 by 17, we shall have 1,700,000 bushels, the quantity of coal to be consumed in the District of Columbia. It is evident that the price of the cord of wood must every day increase, and that in the proportion of the increased labor of bringing it to market, and this not being the case as it relates to coal, for new supplies, not likely to be exhausted, are every day discovered, and hence it is evident that coal must be substituted in the place of wood, and that, to supply the present population of the District with that article, 1,700,000 bushels are found necessary; this quantity of coal at 7 3½ cents per bushel, would cost the District 637,500 dollars per annum, which sum, in all probability, is below the present actual expenditure.

In the neighborhood of Cumberland, where the proposed canal will terminate, the supply of coal may be considered inexhaustible, and in quality it is found to be much superior to the Richmond coal. At the head of the canal, coal will cost eight cents per bushel. It can be brought to this City for 4½ cents per bushel freight, and 2½ cents toll, making the 15 cents per bushel abovementioned. To prove the truth of this fact, take the following estimate: One man, a boy, and one horse, will transport on the canal, and a boat of proper dimensions, 1,200 bushels of the coal 20 miles per day; and, on the tenth day, it will arrive at Washington, in time to unload, it being 188 miles. The man, boy, and horse, will be allowed for each day's service two dollars; allowing the man one dollar, and the boy and horse fifty cents each.† This, for ten days, will cost 20 dollars, and the same sum for returning, making 40 dollars. This will give us, rejecting the fraction, 3½ cents per bushel, to be added to the prime cost of the coal eight cents, and will raise it to 11½ cents per bushel, 2½ cents per bushel for toll; and the coal will cost at the City 14 cents per bushel, and no more; leaving one cent per bushel, that is 12 dollars on the whole load for contingencies.

Thus we find that this coal, on the canal, can be transported to this place, and, after paying tolls at the rate of 2½ cents per bushel, can be sold for 15 cents. Thus saving on each bushel 22½ cents, and on the whole quantity necessary for the consumption of the District, a clear annual saving of 382,500 dollars. The cost of the canal, when completed, is estimated at 2,500,000 dollars; the interest of this sum, at six per cent. per annum, is 150,000. Take this sum from the annual saving in the District on the article of coal, that is, 382,500 dollars, will leave of the sum saved 232,500, to which should be added the amount paid in tolls, that is, 42,500 dollars, which constitutes a fund of 275,000 dollars, which, if applied, would extinguish the debt of 2,500,000 in less than ten years. And all this is done by the an-

† A moment's reflection will convince us that two dollars per day, for services on the canal, is better wages than five dollars per day for a wagoner, wagon, and team of six horses. The first cost of the team, horses, and harness, will be near $1000; the boat and horse not more than 300 dollars. Here is a clear saving, in capital, of 700 dollars, and the boat will last as long as the wagon and horses. In the boat is provided a comfortable cabin, well supplied with provisions for boatmen and horse, and, being always at home, are subjected to little expense.

nual savings in the District of Columbia alone, and *that on the single article of fuel.*‡

Having progressed thus far in the inquiry, and produced the above results, the writer has been induced to pause, to doubt the evidence of his senses, and the truth of figures. He has carefully re-examined his calculations, and can find no error; and, if there be an error, it must be in the estimated quantity of fuel consumed in the District. In ascertaining this fact, he solicits the aid of his fellow-citizens. His object is to come at the truth, and for this purpose he has ventured to set on foot this inquiry.

But, let it never be forgotten that the data on which the foregoing calculations are predicated, is the present population of the District of Columbia, about 33 000, and that it is confined to the article of fuel alone. If the estimated quantity should be found too high at present, will it not be as much too low, when this navigation is completed, and when the city assumes the character for business that its situation deserves, and which it will command, so soon as this improvement is completed?

But, will the usefulness of this navigation be confined to the transportation of coal? Surely not. This will form but a solitary, perhaps a subordinate, item in the scale of its usefulness. There will be scarcely an article found in the markets of the District but will be reduced in the same proportion. Flour, wheat, corn, rye, oats, barley, whiskey, and, in short, all the agricultural products of the fertile upper country, will be b ought to the District, and sold at prices reduced in proportion to the facilities afforded in reaching market. In other words, the farmer *at Cumberland* will find himself, when using the canal for the transportation of his produce, and, on the score of expense, *on an equal footing with the farmer within four miles of the city of Washington*, and who has to use a wagon and horses for the same purpose. This disparity between land and water carriage is, on a slight view, scarcely to be credited, but every man may easily satisfy himself of the fact. Let but the strength of a finger be applied to a boat loaded with many tons in still water, and it will move; and, when once put in motion, the strength of a sewing thread will keep it under way. Further to illustrate this subject, and remove all doubts, let us suppose a boat loaded with forty tons at Cumberland, say distant from Washington 200 miles: this boat is moved at the rate of 20 miles per day, by a single horse, and arrives at Washington in 10 days; a man and boy are the necessary attendants. Let us estimate the services of the man, boy, and horse, at $2 50 per day; the transportation of 40 tons will cost, at this rate, $25. On the other hand, let us examine the expense of transportation by land, of the same weight, the same distance, and suppose also the journey to be performed in the same time: 40 tons will employ 26 wagons, with six horses to each, and each team hauling something

‡ The opinion of a most intelligent gentleman, (one of the Commissioners,) and formed without having seen this statement, is, that the article of coal alone will pay a good interest on the whole cost of the canal.

more than a ton and a half. Taking each team at an expense of five dollars per day, the whole teams employed, for ten days, would cost $1,300. Thus, we say, as $1,300 is to 25, so is 200 miles to 4; the distance being thus diminished, as to the expense. But, this falls far short of the real savings produced by the use of canals. For instance, to transport the 40 tons proposed, 156 horses, each worth 100 dollars, must be used; this employs a capital of 15,600 dollars, vested in perishable property.

Thus, the fact is established, that the City of Washington, if the canal was completed, would, instead of drawing her support from the unproductive neighborhood around her, bring to the distance of that neighborhood the whole fertility of the upper country for 200 miles, and placing her commercial capital and resources *within 76 miles land carriage of Brownsville, on the Monongahela river.* This is no delusion, but sober matter of fact. Brownsville, by the National turnpike, is 72 miles from Cumberland, and it has been demonstrated that the distance from this city to Cumberland, by the canal, is but equal to four miles of land carriage. Thus, by an expenditure of two millions and a half of dollars at most, we have approximated the seat of the General Government, and the tides of the ocean, within 76 miles of the navigation of the Ohio, one of the noblest rivers in the world; and even this distance may be reduced to 43 miles by a lock navigation on the Youghiogeny river, which empties itself into the Monongahela river 12 miles above the city of Pittsburgh and 48 below Brownsville. This river is crossed by the National turnpike 39 miles from Cumberland, and a survey of it has been made for 37½ miles below this point, to the town of Connelsville, where its waters are gentle, and it is believed it can be improved by a lock and canal navigation, for little more than half a million of dollars. This done, *the whole distance from the City of Washington to Pittsburgh would not be equal to fifty miles land carriage.* And here let me observe, that if the improvement of the Potomac be completed, and the distance to Brownsville from this place reduced to 76 miles of land carriage, the whole surplus productions of West Pennsylvania and Virginia, with much of the State of Ohio, will find their market at the City of Washington.

By the returns of the marshals in 1810, it will be found that in the Western counties of Pennsylvania, and that would use this navigation, there were manufactured 371.436 barrels of flour, and 28,722 barrels of whiskey. By this statement, the public will be enabled to judge of the vast importance of this navigation, more especially when they compare the products of a few Western counties in Pennsylvania with the vast fertile country East and West of the mountains, to be accommodated To satisfy ourselves that the produce of the Western country would find a market here, it is only necessary to attend to a few facts. The price of freight on a barrel of flour taken to New Orleans from any point on the Ohio, within 200 miles of Pittsburgh, is $1 25 cents, and this at the risk of the owner. Beside this, the distant trader finds an uncertain market after having travelled 2,000 miles to

reach it: for, his more fortunate countrymen below in Kentucky, Tennessee, Indiana, &c. &c. get a thousand miles, perhaps, the start of him, and he finds a glutted market when he arrives. His flour, by the heat of the climate, is spoiling on his hands, and pestilence and disease staring him in the face. Thus embarrassed and alarmed, he sells his flour for what he can get, and makes the best of his way home. Under these circumstances, is there any doubt of securing the trade of a great portion of the Western waters? The barrel of flour will be brought to Washington from Brownsville for about a dollar, or at most one dollar twelve and a half cents a barrel on the former estimate of 76 miles land carriage, and including 6¼ cents toll on the canal. If further confirmation be wanted of the preference that must be given to this market, it is furnished by the fact that, since the improvement of the Pennsylvania and Maryland roads, thousands of barrels of flour have been taken to Philadelphia and Baltimore from Pittsburgh, and that upon roads far inferior to the National Turnpike, for near 300 miles, and for every mile of which a heavy toll was demanded.

But, the farther we pursue this subject, the more we shall become interested in its magnitude and importance. The limits of a newspaper publication can do it but little justice, and I only add to the list of articles already mentioned that of lumber—the demand for which will increase as the city improves, and may be supplied, by the canal, from the forests of white and yellow pine in the Alleghany mountains, and near Cumberland. The average price of first rate inch pine plank in Pittsburg and on the Ohio river, is five dollars per thousand, and it has often been sold for a much less sum: this plank is floated some hundred miles by the waters of the Alleghany river. In the District of Columbia, plank of the same quality could not be had for less than four times that sum; and, although it is not contended that lumber can be transported on a canal with equal facility and cheapness as on a river like the Alleghany, yet there can be little doubt that the price of this article might be reduced one-half in the District by using the canal, and the same reduction in the price of lime, and many other articles.

Let it now be recollected that the foregoing calculations of profits and advantages to be derived from this canal navigation is founded on the supposition that, when the boat discharges its load at the city, it is to return empty. But, will this be the fact? By no means. The return loads, if not of equal weight, will be of greater value. Let this improvement be once completed, and the merchandise to supply the Western country will be purchased in the District. Mercantile capital has found its way into every corner of the habitable globe, and selected the spots where its employment was found most profitable; and what repulsive quality can be found at the seat of the General Government to forbid the approach of mercantile capitalists? On the contrary, will not such characters be invited thither, where the executive officers continually reside, and where, in the members of Congress, the wisdom and intelligence of the nation is concentrated, the

settled residence of foreign ministers, and the resort of travellers of distinction from all parts of the world? Where could the merchant find a spot so well suited to his views? Or where expect to obtain, with equal facility, the commercial and political information necessary in mercantile pursuits?

But, articles of mere merchandise are not the only ones necessary for the Western trade. The list of other articles is an extensive one, but we shall only notice those of fish and plaster of paris. The demand for these articles is, at present, great, and will constantly increase with the improvement of our country. The supply of fish within reach of the city is inexhaustible. Besides the fisheries of the Potomac, its bays, and inlets, the earth cannot furnish a fish-pond like the Chesapeake. Here, a supply equal to the demand can be obtained. A barrel of salted fish will be delivered at Brownsville, using the canal, for one dollar and twelve and a half cents freight, which, added to the prime cost, will reduce the present price at that place more than one half: and, as all the waters of the Ohio river furnish a scanty supply of fish, and those caught are always used while fresh, the quantity necessary to supply the demand of the Western country would be immense.

Let us stop here and review the ground we have occupied.

The entire cost of this lock navigation has been stated at two and a half million of dollars. The saving to this District on the article of fuel alone, would discharge the debt in less than ten years. Other articles of consumption have been noticed, on which a like saving would be had, and that, if it were possible to ascertain their exact amount, would, in a single year, be equal to half the expense of the canal, and in these calculations no notice is taken of the profits secured by the sale of merchandise, fish, plaster, &c. which would be purchased here, and sent by means of the canal to the West.

In short, the more the subject is examined, the stronger will our convictions be of the benefits that would result, not only to the District of Columbia, but to a vast surrounding country, if the Potomac navigation was completed. And, should any consider the foregoing calculations too high, let them be reduced, and profits thrown away with both hands, still enough will remain, by the most unfavorable estimates, to convince the most incredulous sceptic of the practicability and usefulness of this undertaking.

No. II.

Since my communication to you on the subject of the Potomac Navigation, the columns of the Intelligencer and some of the other papers of the District have been examined, and nothing has been published disapproving the scheme, or controverting the general correctness of the positions laid down by the writer; but, on the other hand,

an unqualified acknowledgment of the practicability and usefulness of the undertaking : and, moreover, the communication alluded to has been republished in many of the Western papers of Pennsylvania and Virginia, with similar approbation. Thus encouraged in his feeble efforts to promote the interests of his country, the writer will venture further to prosecute his inquiry; and, as his former remarks were confined principally to the advantages to be derived by the People of the District of Columbia, in furnishing them a supply of the articles of fuel at a cheap rate, by means of the canal, his object will now be to treat the subject on a more enlarged scale, and show the probable quantity of coal that would pass the canal to supply the demand out of, and beyond the bounds of the District ; and, in the second place, to demonstrate, by facts incontrovertible in their nature, the superior advantages the Potomac navigation has over that of James river, in Virginia, and the Hudson and Erie navigation in New York ; more especially on account of the permanent coal trade on the former route, and by which neither of the latter routes are likely to be benefitted.

The writer is aware that comparisions are invidious, and sometimes odious ; but this depends much upon the spirit and feeling in which they are conceived, and the manner in which those feelings are expressed ; and he is equally aware of the high importance of the inquiry in which he has engaged, and the inadequacy of his talents to do it justice ; but, when his motives are appreciated, and his views understood, he has full reliance on the public indulgence, and that they will, in common with himself, feel sincere regret that so great and good a cause should not in its defence have secured an abler advocate. And in accordance with these views, he again invites and solicits the aid of others in the furtherance of an object, the completion of which (as he believes) involves the best interests of his country.

It will be recollected, in the former publication on this subject, notice was taken of the quantity and quality of the coal to be furnished at the Cumberland mines. Since the above observations were written, an opportunity has been personally had of further examining this subject, and the result has been to confirm what was then suggested. The mines already opened would furnish a supply to any amount that might be demanded : the coals lie in horizontal strata of ten feet and upwards thick, and may be had at the price stated—eight cents per bushel. This coal, in quality, will be found superior to the Ohio or Pittsburgh coal ; it contains less bituminous and sulphurous matter than that coal; and of course, will be found more useful to blacksmiths and others engaged in manufacturing articles from iron or steel, and for which purposes, much of the coal of the Western country is found totally unfit—the sulphur contained therein destroys the tenacity of the iron or steel ; and the bituminos substance in the Cumberland coal being much less than that of Pittsburgh, it will of course emit less smoke, and be less offensive, and more suitable and pleasant for household or culinary purposes. In short, the Cumberland coal, if analyzed, will be found a much purer and more perfect carbon than that of Pittsburgh, and still *perfect* in a much higher degree when campar-

ed with the coal of Richmond. Having thus fairly established the superior quality of the Cumberland coal, let us examine the extent of the country and population that would be likely to draw its supply from this source. By an inspection of the map of the State of Maryland, it will be found that every county in that State (except Allegheny, in which the coal is found) would lie either on the canal, the tide water of the Potomac river, or the Chesapeake bay, containing a population, by the census of 1810, of 373,637 ; to this the counties of Virginia, which lie on the Potomac, beginning at Berkley and ending with Middlesex, including the two counties of Accomac and Northampton, a population of 126,699 should be added, making a total population of 500,336 : which will, to the extent required, be supplied with coal from the mines of Cumberland.

Here the reader (as well to test the truth of this fact as to prepare his mind for the results that will follow its admission) is requested to examine the maps of Maryland and Virginia. He will find in the latter State but a narrow strip of land, bordering the Potomac river, designated as likely to be supplied with coal by the canal ; he will see the South branch of the Potomac, the Shenandoah, the Rappahannock, and York rivers all presenting equal claims for a supply of this necessary article : and I have little doubt he will be brought to the conclusion, that, instead of half a million of People who will put in their claims, we shall have 150,000 more aded to that number. But, notwithstanding these views, which the writer believes are fairly within the bounds of reason and probability, still, in his calculations, he will adhere to his original ground, of "not allowing himself to be misled, nor of being the means of misleading others ;" and, with this view, instead of a population of half a million and upwards, he will suppose that 8000 families are to be supplied out of the District of Columbia, or a population of 60,000 ; which is only double the population contained in the District.

In my former statement it will be found that 1,700,000 bushels of coals were necessary for the consumption of 4000 families living in the District; and to this number it is proposed to add 8,000 families who reside out of it, which adds to the quantity of coal required for consumption 3,400,000 bushels, and on this quantity we will allow ten cents per bushel for additional transportation, which, added to the toll and expense of transportation on the canal, will reduce the actual saving to 12½ cents per bushel, and make the actual saving on this additional quantity amount to 425,000 dollars per annum, and the additional amount of toll to 85,000 dollars, which being added, give us 510,000 dollars per annum, as a new source of advantage arising and enjoyed by the People without the District, and when added to the sum estimated within it, will give us 935,000 dollars, as the actual aggregate profits per annum of this improvement, as it regards the article of fuel, which sum would be found more than sufficient in three years to complete the canal ; or, if considered as a dividend on the capital stock of 2,500,000 dollars necessary to construct the canal, will be equal to 37½ per cent. per annum. But to occupy

still surer ground, let us reduce the quantity one half, and the savings in the same proportion, and still we shall make a dividend on the capital stock of 18 per cent. per annum, and pay the cost of the *canal* in six years. This saving, and the profits to be derived from the coal trade, has been pressed with more zeal because the writer has reason to believe it has been too much overlooked, and its importance has not been sufficiently appreciated by those who have written on the subject, and he is determined, if possible, not to leave an individual who will read and think for himself, until he is convinced of its importance, and of the indispensable necessity, as well as the extensive usefulness of the Potomac navigation. The writer has not made up his mind hastily, or drawn his conclusions rashly on the subject; he feels sure of mantaining the ground he has occupied; he has personally discovered the fact, that the Alleghany mountain at the head of the canal is based on a bed of stone coal; the horizontal position in which it lays will enable the miners forever, without trouble, to keep the mines free from water, and with ease, cheapness, and convenience, in carriages drawn by oxen or horses, deliver the coal at the mouth of the mine, and the miners themselves, at pleasure, may enjoy the light of Heaven, and take their rank among the inhabitants of the visible world. These are facts of no trifling import, and deeply interesting to a million or more inhabitants who occupy the country below the foot of the Alleghany mountains. The citizens of our sea port towns are sometimes in the habit of using British coal, obtained there, perhaps some thousands of feet below the surface, and transported by a canal to some sea port; after a voyage of at least three thousand miles, it reaches the city of Washington, or Baltimore, and this may, perhaps, (if we still remain blind to our interest,) be eventually the channel through which we are to be supplied with this article of indispensable necessity: for it is idle to expect our sea ports to flourish and prosper, while dependent on the wood of their surrounding neighborhoods as a necessary supply of fuel; the farmers in a short time will have a scanty supply for themselves, and this supply will be daily diminishing, whilst its demand is increasing, and of course its price enhancing; thus, scenes of distress and suffering, especially by the poorer inhabitants of our cities, will be exhibited, during the severity of our winters, that will be shocking to humanity; and here this branch of the subject shall be closed, and the writer will attempt to shew that, if all the advantages of the coal trade, (great as it must be considered) be rejected, still the Potomac navigation has, on other accounts, the advantage, *most manifestly*, over the New York and James' river canals. Here the writer is anxious that his motives should not be misunderstood; nothing is more foreign to his objects and views than a design to undervalue the importance, or discourage the prosecution of those great improvements, or to question their extensive utility: his purpose in the following comparison *is*, (and he wishes it not to be concealed,) in the first place, to show what he thinks an undeniable fact, that the Potomac navigation has, in a political and pecuniary point of view, much the advantage over either of

the other routes; and in the second place to present this as a strong inducement to all concerned in the Potomac navigation, to engage with zeal and promptitude in its prosecution. For, shall New York, Pennsylvania, Virginia, North and South Carolinas, be actively and vigorously engaged to promote their true interests, and shall nothing be able to *awaken* from their *state of torpid indifference* the citizens of the District of Columbia, of Baltimore, and the surrounding country? It is fondly hoped, that the example set by their wise, industrious, and enterprizing neighbors, together with the decided advantages of their local situation, will stimulate them without further delay to vigorous exertion.

The length of the James' river canal, (as proposed) from the tide water at Richmond to the mouth of Dunlap's creek, is 250 miles, and the elevation at the mouth of this creek above the tide is 1238 feet. The length of the Potomac canal, from the tide water to Cumberland, is 188 miles, and an elevation of 715 feet, giving a difference in favor of the Potomac route, in distance, of 62 miles, and in less elevation of 523 feet. The portage from the mouth of Dunlap's creek to the Kenawa river, below the falls, is 90 miles on the James' river route, and only 72 miles from Cumberland to the Monongahela river, at Brownsville, on the Potomac route, leaving a difference of 18 miles in favor of that route. Thus we find, allowing 1000 dollars per foot, (the usual price,) for 523 feet of extra lockage on the James' river canal, we shall have the sum of 523,000 dollars of increased expense, to which add 855,000 the expense of excavation, feeders, aqueducts, &c. on 62 miles of canal, at $3,494 per mile, it will give us the sum of 1,111,628 dollars, or the excess of expenditure necessary on the James' river canal over that of the Potomac. And as there is from Cumberland, on the Potomac to Brownsville, on Monongahela river, a free turnpike road constructed and bridged in the most durable manner, at an actual expense of 9,500 dollars per mile, it is but fair, in this comparison, to state that, before the James' river canal can be useful, a road of a similar construction must be made across the mountains to connect the canal with the Kenawa river. The length of this road being 90 miles, at the above price of 9,500 dollars per mile, would cost 855.000 dollars, which added to the extra cost of the Richmond canal, would give the total sum of 1,966,628 dollars, which the Richmond route, if completed, must cost more than the Potomac route. Having thus, by a fair calculation, found a balance of 1,966.628 dollars in favor of the Potomac navigation, in its first construction, we endeavor in vain to find any superior advantage in that of James' river to countervail this enormous difference in expense. For, if we suppose both routes completed in the same manner, and a free road constructed in the best manner and of the best materials* across the mountains, on the Richmond and Ken-

* Those in any manner acquainted with canals will know the necessity for such a road; inclined planes, rail roads, and other devices, are often resorted to to overcome the inconvenience of land carriage, when necessary to the operations of canal navigation; for, so vast is the difference between transportation by land and on a

awa route, the trader with his cargo leaves Richmond, and after passing a canal and portage of 340 miles, finds himself on the Kenawa river, 94 miles from its junction with the Ohio; when, if the city of Washington had been made the starting point, he would, in 260 miles have found himself on the Monongahela river, within 60 miles of the city of Pittsburgh, avoiding by this route the expense and detention of passing over 18 miles of land carriage, 62 miles of canal, and the lift of 523 feet of elevation by the means of locks.

Let us now proceed to contrast the Potomac navigation with that of New York. This contrast is submitted with greater cheerfulness, because the completion of this work is considered no longer problematical, but viewed as in such a state of forwardness as to ensure its completion in a shorter time, and at a less expense than had been anticipated by its warmest advocates. This canal commences at Albany, on the North river, 160 miles above the city of New York, and continues its course through the interior of that State, for about 360 miles, until it connects itself with the lower extreme of Lake Erie, making use of its waters as a feeder. The object of this canal, besides securing the trade of the Upper Lakes, is to facilitate the intercourse between the sea ports of the State and its interior—embracing, in its flexuous passage, a great extent of fertile country, it will afford a convenient interchange of the agricultural productions of the soil for the various articles of necessity and convenience, to be found on the sea board. But it is truly unfortunate that, through the whole extent of this canal, no mention is made of a prospect of supplying the cities and lower country generally, with the article of stone coal; and, after the calculations and estimates already made on the supply of this article by the Potomac canal, it cannot be doubted but the profits and savings on it alone would produce an annual dividend of more than 15 per cent. on the capital stock necessary to complete the New York canal: and, independent of this important and decisive advantage, it is presumed that the Potomac navigation may fairly enter into a competi-

canal, that, unless the road be of the best order, and the distance short, freight cannot be provided in sufficient quantities to justify the expense of constructing the canal. To illustrate this subject more fully, let us suppose the Richmond canal completed for 250 miles to the mountains, and ready to receive the products of the western country, and its cost on the estimate already made, 3,611,500 dollars, the interest on this sum at nine per cent. (which would leave a handsome dividend to the proprietors after deducting for necessary repairs, gate keeping, &c.) would be 325 035 dollars. To raise this sum on the canal at New York rate of toll, one cent per ton per mile, it would be necessary to transport on the road 130 014 tons, and that at one and a half ton per load for a wagon and five horses, which is as much as can be drawn on an imperfect road, would employ 3,467 teams and 17,335 horses; each team carrying a load, is supposed to travel 15 miles per day, and make the trip across the portage of 90 miles back and forward in 12 days, and to employ 300 days in each year; the whole cost of those teams at five dollars per day, would be 5,200,500 dollars per annum; and the actual travelling on the road each day would be 52,005 miles; and if the teams were distributed at equal distances on the whole extent of the road, they would not be more than five perches asunder. A road to bear this travelling, or even the third of it, must be made in the best manner and of the best materials; and instead of an expenditure of 1000 dollars or 1200 per mile, 10,000 or 12,000 should be expended, or the great object of this magnificent work which is to connect the Atlantic with the western waters will be defeated.

tion with that of New York for the western trade, and, were it not that it might be considered ungenerous to ask a further triumph than is had by the coal trade, it would be contended that the advantages in this regard are in favor of the Potomac navigation; for it must not be considered a trifling inconvenience for that of New York, lying four degrees further north, to be locked up with ice for two months longer each year than that of Potomac, during which period the merchants of the District of Columbia and Baltimore,* may receive from, and send abroad, the productions of the western country, to the amount of millions of dollars, and have the same advantage, by back loads, of supplying spring and summer goods; and, as the trade of western Pennsylvania, and half the State of Ohio, has been claimed by the advocates of the New York canal, let us fairly contrast the advantages of both routes, as it regards this trade—and, as Pittsburgh, from its local situation and superior advantages, is, and it is believed will forever continue to be, the great depot and emporium of that part of the Western country in question, more especially since the application of steam power has overcome distance to that place, let us therefore take that point to test the question of convenience.

From New York, through the Hudson river and the canal to its termination on Lake Erie, is 520 miles; thence, up the Lake, 90 miles, to the town of Erie; thence, by a portage of 14 miles, to Waterford; thence, by French Creek and the Alleghany river, 160 miles to Pittsburgh; making the whole distance on this route, from New York to Pittsburgh, 784 miles—while from Washington, by the way of Cumberland, on the Potomac, and Brownsville, on the Monongahela river, is only 320 miles, leaving a difference in distance of 464 miles in favor of the Potomac route. It is true, the New York route has 58 miles less portage than the Potomac, but, to balance this, it has from Pittsburgh 100 miles more of up-stream navigation, to arrive at the Waterford portage, than those who pursue the other routes have to arrive at the Brownsville portage. In the latter case, those at Brownsville are within 260 miles of the City of Washington; in the former, those at Waterford are 624 miles, and have 14 miles portage, 90 of lake navigation, and 520 by the canal and Hudson river, to the city of New York, instead of 72 miles' portage, and 188 canal on the Potomac route, to the city of Washington. And it should not be forgotten, that the portage from the Potomac to the Monongahela river may be reduced to 39 miles, by an expenditure of little more than half a million of dollars to complete the navigation of the Youghiogany river, from the national road to its mouth on the Monongahela river, 12 miles above Pittsburgh; and little doubt can be entertained of the practicability of connecting, by a lock navigation, the Potomac and Youghiogany rivers. They take their rise, and intermingle their waters in the same neighborhood, and it is believed might be connected at an expense much less than the estimated expense of the New York canal.

* It is contemplated, as a part of this scheme of improvement, to take a branch of this canal from near Harper's Ferry, on the Potomac, by the best and nearest route, to the city of Baltimore.

Here the writer will close his comparative views of the different routes. Errors may have crept into his calculations, and he may have been misinformed as to some facts stated. His means of obtaining information has not been as extensive as he could have wished. He has, however, aimed at fairness and impartiality. His object for taking this view of the subject he has candidly avowed. If, however, he should have run counter to the opinions or views of others, and incurred their censure, it will to him be a subject of much regret. To his fellow-citizens of New York and Virginia, he feels sentiments of the highest gratitude for their laudable exertions to improve the condition of their country, and he has, on this account, felt some reluctance in presenting a scheme of improvement, which, in a national and political point of view, as well as on the score of pecuniary advantage, seems to him of greater magnitude and promise than either the New York or Virginia schemes. And if there should be some collision of interest involved in the prosecution of these great works, still relief is afforded by the certain anticipation, that, if they are all completed, ample indemnities may be realized by all concerned, and the public spirited citizens of New York will have this pleasing reflection, that they have gone foremost in the good work, and set an honorable and wise example, that has been followed by others.

Although this subject may be dry and uninteresting to many of your readers, yet it is surely one of the highest interest to the nation, and worthy the attention of the patriot and statesman.

No. III.

In my former observations on the subject of the Potomac navigation, it was attempted, and, it is hoped, fairly shewn, and that by estimates so certain and moderate, that none can doubt their correctness, that the improvement might be completed for the sum of 2,500,000 dollars, and, when completed, there would be an actual saving to those immediately concerned, east of the mountains, of 935,000 dollars per annum, or an interest of 37½ per cent. on the sum expended; and that those pecuniary advantages would result *exclusively* from the reduction made in the price of *fuel*, an article of indispensable necessity, and the demand for which must consequently increase, and that in proportion to the increased industry and improvement of the country. And it has been further shewn, that the advantages thus arising from the coal trade on the Potomac canal, are not calculated upon; neither is it likely they can be realized by those concerned in similar improvements in other parts of the United States. After having ascertained these facts, it might apper unnecessary to press the subject farther; but its vital importance to the nation at large, as well as to those more immediately and locally concerned, demands that every honest and honorable effort should be made to encourage and facilitate

its commencement, and insure its completion. The writer is aware that the strongest arguments have been pressed upon the public, and from the highest authority, in favor of public roads and canals; and enough has been said, and without contradiction, to establish the fact of their necessity and utility in a political point of view; yet still, little has been done by the general government to encourage these important objects.* What effect, then, can public recommendations have, but to discourage individual enterprize? Will not the moneyed capitalists on this subject reason thus? "If the agents of the Government, and those who have the control of the public funds, are sincere in their declarations in favor of those public improvements, and of their extensive national utility, why is not the public money employed for their accomplishment? Is not this backwardness to undertake what they so strongly recommend, an evidence that some doubts are entertained that funds, thus employed, would be found unproductive?" And the next inquiry would naturally be, how it could be expected that private individuals would embark their fortunes in an undertaking that was to benefit the public, when the public functionaries thought the enterprize too hazardous for public patronage? It would, therefore, be a great point gained, if all doubts could be removed on this subject; and, as the general government, and that of Pennsylvania, have recently found no difficulty in borrowing money at five per cent. interest, there can be no doubts entertained of obtaining the sum necessary to complete the object before us, if satisfactory assurances be given, that not only five per cent. per annum shall be realised, but more than three-fold that sum, by the investment of capital in stock that it is proposed to create, for the purpose of completing the proposed canal. The writer, therefore, confidently believing that he will arrive at the proposed result, invites the reader to accompany him a little farther in this important examination. Some years since, it was ascertained by the people of the city of Pittsburgh, and its vicinity, that goods and merchandise to the value of 30,000,000 dollars, was brought to that place from the eastward, and that the carriage cost one and a half million of dollars in a single year. That sums equal to the above, or nearly so, were paid for goods and merchandise, taken on other routes to the western country, will not be doubted; and, if so, it will be found, by calculation, at the usual rate of carriage, at that time, about 15,000 tons of merchandise passed the mountains in a single year, to supply the western demand.

It will, therefore, not be deemed extravagant, if we assume 10,000 as the annual tonnage of those articles which will be sent by the ca-

* When we consider the capital of the United States situated on the tides of the Potomac, and that river, within a distance of two hundred miles, mingling its waters with those of the Ohio, is it *not strange* that a survey has never yet been authorized, to ascertain the fact, whether it be not practicable to connect those waters by a lock navigation? In the meantime, we have pushed, and are pushing, our discoveries to the upper lakes over the Rocky Mountains, and to the shores of the Pacific. No complaints are made in the latter case. These things are rightly done, and the former should not have been left undone. It is understood, that an individual or two, at their own expense, (which will be but small,) intend to undertake the task.

nal westward, particularly when we include, at a reasonable toll, plaster of paris and pickled fish; 10,000 tons passing the canal at two cents per ton per mile, (the New York price for merchandise,) would give in toll 40.000 dollars; and this sum would by no means be the whole saving to the western purchasers; for to this should be added the profits of the merchant, which, beside the freight, will be apportioned to the expense, difficulty, and hazard, of transporting his goods to the place of sale; and, it will be observed, that the real advantages of this navigation will not be materially affected by the rise and fall of produce, nor the fluctuations in the price of transportation; the real benefit of the country will be the economy of labor, or the difference between land and water transportation, which we have already shewn to be as *one hundred to four*, or perhaps something less, in favor of the latter mode of conveyance.

In my first number it is shewn, that, by the returns of the marshals, in the year 1810, there were manufactured in the western counties of Pennsylvania, 371,430 barrels of flour, and 45,750 barrels of whiskey, making, of those articles alone, 62,261 tons: let us, then, add to the manufacturing industry of those counties, those of the States of Virginia, Ohio, and Maryland, that would use the canal, and suppose that all put together would only transport 62.261 tons of flour, whiskey, gin, brandy, cider, ale, beer, vinegar, &c. this, at one cent per ton per mile, would give us in tolls 124,522 dollars; add to this 40,000 tons, or tolls to the amount of 80.000 dollars, estimated on the transportation of the following articles, that is, corn, corn meal, rye, buck-wheat, oats, barley, flaxseed, pulse, hay, fruit, potatoes, turnips, and vegetables of all kinds; beef, pork, bacon, hog's lard, butter, cheese, tallow, bees' wax, pot and pearl ashes, ashes, soap, hemp, flax, linen, cordage, salt-petre, tobacco, &c. &c.—of this latter article, tobacco, a gentleman of Kentucky has this spring sent his crop up the Ohio to the town of Wheeling, and from thence by land to the city of Washington; then, let us add to this list one other item, made up principally of heavy articles, that is, ship timber for the Navy of the United States and the building of private vessels, boards and scantling, heading, staves, and hoop poles, tanners' bark for domestic use and exportation, tar, pitch, and rosin, marble, lime, slate, iron ore, pig and bar iron, and castings, estimated at 70,000 tons, or tolls to the amount of 140,000 dollars. Thus, we find the aggregate tolls received on the foregoing estimate, will be 384,552 dollars, to which add the tolls to be received by the transportation of coal, according to our former estimate, 137,500 dollars, making the total receipts of tolls per annum amount to the sum of 522,052 dollars, or a dividend yearly of 18 per cent. on the capital employed, and this after deducting the sum of 72,052 for repairs, and the expense of attendance, &c. This profit would belong exclusively to the proprietors of the works.

But, if we take the actual difference between the expense of land transportation and that on a canal, as established in my first number, we shall find that the nation would save, per annum, by this improve-

ment, the sum of 10,000,000 dollars. Perhaps, however, the foregoing estimates may be considered extravagant, and the number of tons supposed as likely to pass the canal too great. Before such conclusions be drawn, the writer sincerely hopes the subject may be fairly examined. He has not written to amuse the public, nor made his estimates hastily. It has cost him some research and much reflection before he ventured to let the result of his calculations meet the public eye. Any estimates made of the usefulness of this work, based entirely upon the present state of the country, will be erroneous. Great allowances must be made for the increased demand that will be afforded for all the necessaries and conveniences of life, by means of this canal. We must not consider the present state of improvement in the city of Washington and the District of Columbia as a proper criterion to determine its future progress, if the canal be completed: for about one third of the year every road leading to or from the city is, by deep mud or miry clay, rendered almost impassable; and, added to this, we find immediately above the city the river Potomac *blocked up by natural obstructions;* and thus communication with the country is measurably cut off: and the consequences are, that, at such seasons, the markets are badly supplied, and the prices exorbitant; and this is also the case with every article of necessity, particularly that of fuel. And, under circumstances so adverse, it has frequently been cause of astonishment to the writer, that the inhabitants of the place were able to make the progress in improvements that they have done. And several turnpike roads have recently been pushed a small distance into the country, but have not yet reached the fertile settlements to the west, either in Maryland or Virginia. But how changed would be the condition of this place was a lock navigation completed to the mountains! By this means, and on the best terms, the wealth of the intermediate country, and the boundless supplies of coal and timber of those mountains would be secured; and, beside this, the immense trade of the western world would find the most convenient market in the city; and, under those circumstances, and with these stimulants to industry and enterprize, would it be unreasonable to suppose that, where there is at this time one building erected, we should then be able, in the District, to number twelve or fifteen? Neither would this state of increased improvement be confined to the District alone. On and adjacent to the canal, towns would spring up as if by enchantment, and, in time, its whole line would present one continued and flourishing village, and the surrounding country would catch the vivifying impulse, and be awakened to fresh industry and exertion. The farmer would find a market at his door for a thousand articles that heretofore he has neglected to cultivate, because, if produced, would not have borne the expense of land transportation to a distant market.* But, with the advantages of the

* The country through which the canal will pass, and especially all the counties from Alleghany to Baltimore, are peculiarly adapted to the cultivation of the fine yellow tobacco, which sells for 30 dollars per hundred weight, which can best be raised on new land. By the adoption of coal instead of wood, these lands will immediately yield more than they would now sell for

canal, he will find the pecuniary profits of a single field, or his garden, equal to that of his whole farm without those advantages; even his barren hills of pine, heretofore neglected and useless, will afford in abundance articles of immense value, and become sources of extensive profit and income. In fine, the country will change its aspect and character; instead of discontent, meagreness, and want, we shall see happiness, gratification, and comfort, beaming in every countenance, and fulness and plenty abounding in every cottage.

With this view of the entire new condition of the country, and its advancement in agriculture, in manufactures, and in commerce, can there be any rational doubt of the truth of the positions taken? or shall we find any willing to call in question the general correctness of the estimates made? If, however, such should be found, all that is claimed by the writer, or desired, is, that the decision be not made without first giving the subject a deliberate and impartial examination, without which it would be unfair and unjust to condemn; and, if this be dispassionately done, the result cannot be doubtful. The writer's confidence remains unshaken. The more pains he has taken to investigate the subject, the stronger have been his convictions *of the fact*, that, if the proposed canal was completed and in operation, it would add yearly to the public wealth at least *ten millions of dollars*, beside a nett dividend to the undertakers of *eighteen per cent. per annum* on the capital expended.

But, to present the subject in a still more striking point of view, let us suppose that the calculations are one half too high, and that the country would save *only* the sum of 5,000,000 dollars per annum, and the proprietors of the work *only* divide nine per cent. This, surely, could not be considered a trifling object. A tax imposed at this time, and to that amount, on the people of the United States, would be considered oppressive; and yet it cannot be denied that a sum at least equivalent to that is either actually paid or lost every year, by those concerned in the navigation of the Potomac, for want of the proposed improvement, and which, if completed, would enable those immediately interested, if necessary, to pay a tax of this amount, and still be left in better circumstances than they are at present. And, if this be the case in time of peace, what will be our situation during the operations of war? The dear-bought lessons we were taught in our late struggle with Great Britain should not be forgotten. It is confidently believed that the General Government expended a sum equal to the estimated expense of this work in transportation across the mountains, and much of it from Washington and Georgetown, during the continuance of the late war. But, as this branch of the subject will require a separate examination, it would be premature to press its consideration in this place. Before we enter upon a discussion of this subject as statesmen and philanthropists, and show its moral and political effects in a national point of view, let us take some notice of the States and Districts more immediately concerned.

It has already been observed, that this improvement would open either a canal or tide water navigation to every county in the State of

Maryland. One other observation will be sufficient to awaken all the energies of this State, more especially the citizens of Baltimore. It is this: the Legislature of Pennsylvania, at their last session, have done what they should have done twenty years ago—taken the necessary steps to connect, by a lock navigation, the Delaware River with the Susquehannah. This work, when completed, will secure to the city of Philadelphia the immense trade of the Susquehannah country to the New York line, and no inconsiderable part of the trade of that State, embracing a region of fertile country containing at least 10,000,000 of acres. For the trade of this country, the city of Baltimore has hitherto been a successful competitor. For this purpose, the enterprizing citizens of that place have pushed a turnpike road, not only to the Pennsylvania line, but (by the consent of the State) to the Susquehannah River, at the head of the Conawango Falls, and a small distance below the mouth of Swatara Creek, the waters of which are made use of as feeders to the canal that is to connect the Susquehannah and the Delaware Rivers. With this view of the subject, it is evident that the Susquehannah trader, when he arrives with his boat at the canal, will take that avenue to the Philadelphia market, rather than unload his cargo and take it overland to Baltimore; and the result will be, that, to the latter city little will be left of the Pennsylvania trade but a few counties on the southern line of the State. The enterprizing Baltimoreans will look their situation full in the face, and provide for this diminution of their trade to the north, by securing as far as possible, through the medium of canals, its equivalent in the West.

The advantages of this improvement to the City of Washington, and District of Columbia generally, have already been stated, *and demonstrated;* and, as it relates to the city itself, it would be no difficult matter to adduce proof positive, that, without the aid of the proposed canal, it has nearly reached the summit of its greatness, and that, with such aid, it might, and *soon would*, take its deserved rank among the principal cities of the Union. Such was its destiny in the anticipation of its immortal founder, whose name it bears; and such it will be, if his advice and admonitions, *on this subject*, be not totally overlooked and disregarded.

No. IV.

The State of Virginia is highly interested in the Potomac navigation. The north, or what is improperly called the principal branch of this river takes its rise in this State; and, beside this stream, we find the South Branch and Shenandoah rivers heading in the heart of the State, and furnishing, particularly the latter, an extensive navigation, leading through, and watering, a tract of country highly cultivated, and inferior in point of soil and fertility to none east of the mountains.

We find, moreover, that the whole length of the canal will be on the line between Virginia and Maryland, and whether it pursue the north or south side of the river, or be carried across it in aqueducts, will not be very material to either State, in the general scale of its usefulness: for, on whatever side it passes, bridges must be erected across the river from the other side, at suitable distances, to facilitate the transportation by land to the canal. And, likewise, below the mouths of the boatable streams that fall into the Potomac, locks must be erected on the canal and connected with the river, by which means the boats out of the Potomac will be lifted into the canal; and by these means the advantages derived by the States respectively, will be reciprocal. Besides the immense advantages secured to Virginia east of the mountains, that State has a considerable territory lying on the west, and to the inhabitants of that territory this improvement will be of vital importance: reference is had to the country drained and watered by the Monongahela, Cheat, and Tygert's Valley rivers. The navigation of these streams is of considerable extent. The main body of the land in this tract of country, although somewhat broken, is said to be remarkably fertile and productive, the climate is favorable, and a more healthy situation is not to be found in the United States. Notwithstanding these advantages, we find this country, with few exceptions, very thinly settled, and thousands of acres of valuable land not settled at all. We find, likewise, hundreds of Virginia families forsaking the land of their forefathers, leaving the Monongahela valley and the State of Virginia five hundred, or perhaps a thousand miles in the rear, and settling the boundless forests of the west. This is easily accounted for; the Monongahela country, in this State, is encompassed by mountains of great elevation, through difficult defiles; and over these mountains you have to clamber mostly on pack horse roads to reach the interior: and, when there, you have no other egress or outlet, except through the unimproved rivers already mentioned. New Orleans has hitherto been considered their only eligible market; the circuity of the route, the immense distance, and, in short, all the objections already mentioned to that market, apply with increased force to the inhabitants of the country in question. They are actually impounded, and cut off from a profitable or friendly intercourse with the world. It is no wonder, then, that this rich Virginia wilderness should remain unsettled, and that the enterprising members of her own family should seek a residence far beyond the limits of her "ancient domain." Good children never leave a parent's roof, nor resign the endearments of *home*, (*the most precious word in the English lexicon,*) without deep regret, and what is considered a strong necessity, to better their condition, and set up for themselves. If this object can be effected, and a situation found within their native State, and within reach of their former relatives and friends, how gladly is it embraced! Apply these self-evident truths to the case before us. Let Virginia go on as she has begun: let roads and canals be pushed into her back settlements; let the waters of the Monongahela not be neglected, but improved, and by her aid the Potomac Canal be completed; then

her back lands will be settled by those of her own household ; she will retain the services and affection of her children, by providing them settlements within her own territory, and a home market. This done, she will no longer have reason to regret their disposition to wander and roam from the paternal mansion ; her population will keep pace with her sister States, and she will retain the elevated rank she has heretofore held in the Union.

In justice to the enlightened policy of Virginia, it is observed, with pleasure, that great efforts are now making to improve her condition, by the construction of roads and canals, and the improvement of the beds of her streams; her most distinguished characters have engaged personally in this good work. And that the Potomac has not been overlooked entirely, we are assured by the passage of a law at the last session to appoint commissioners to examine the state of the improvements on that river, and an invitation to the State of Maryland to join her in this examination. What will be the result of this inquiry is not yet known. Nothing has been mentioned or suggested by the writer on this subject with a view to complain, much less to censure Virginia in this regard; all that is asked or expected, is, that her resources will be applied to this object in proportion to the interest her citizens have at stake in the accomplishment of this beneficial improvement; and from her recent conduct a full guarantee is had that in future those interests will not be disregarded.

In the next place let us examine the situation of the State of *Pennsylvania* in relation to this subject. The fiscal concerns of this State would indeed be considered a phenomenon in the old world; for nearly forty years her government has been supported without loans and without taxes, direct or indirect (except a small sum annually raised on tavern licences, and sales at auction ;) and through the medium of tax officers, where governments are generally best known, that of Pennsylvania is neither known nor felt.

But, without resorting to loans or taxes, the finances of Pennsylvania have been so managed, that the surplus revenues of her exchequer have generally amounted to about 100 000 dollars per annum, which sum has been regularly vested in productive funds or applied to purposes of public education. or the improvement of the State. Not a county in Pennsylvania but has a public seminary of learning, reared and fostered by the aid of State funds. Neither have her exertions been less vigorous and efficient in the construction of roads and the erection of bridges. It is confidently believed that the turnpike roads constructed in Pennsylvania by the combination of public and private funds will be found, uniting expense and distance, to double that of any State in the union. Her attempts, however, in the construction of canals and the improvement of her streams, have been less successful. The great error seems to have been in the misapplication of the public funds by unskilful or unfaithful agents. A board of managers should have been established; men distinguished for their skill, talents, and integrity. They should have planned the work, and directed the application of the money.

Many years since, the Legislature of Pennsylvania incorporated companies for the purposes of connecting the Delaware with the Susquehanna river, by a cross cut navigation. This work was commenced with vigor, but has been for a long time, for want of funds, suspended. At the last session the Legislature did what should have been done long before—took steps to resuscitate the credit of the company; and who have, since the passage of this law, provided the funds for completing the canal. This done, and all the trade of East Pennsylvania, as has been already observed, with the exception of a few counties, will be forever secured to the city of Philadelphia; and, to insure the lasting prosperity of that city, one other improvement is necessary—a slack water navigation from the coal mines of the Lehigh to the tides of the Delaware. All my former arguments and estimates in favor of the Potomac navigation, in regard to the coal trade, will apply to this case.

The commercial prosperity of Philadelphia thus established, that city may repose, with certainty, upon the support of eastern Pennsylvania, and a community of interests will insure the permanency of this connection. But there will remain a large portion of the citizens of that State west of the mountains, that can never participate in those advantages. Suppose the canal completed from Philadelphia to Middletown, its proposed termination on the Susquehanna—there would then be from Pittsburg to this point a land carriage of about 210 miles, and from Pittsburg to Cumberland, the head of the Potomac canal, about 130 miles, 72 only of land carriage; the residue on the river Monongahela, with a fall ascertained to be only six inches to the mile in the whole distance from Pittsburg to Brownsville, at the national turnpike.

Having ascertained these facts, it is evident that the productions of the western country can never find a market at the city of Philadelphia; and that a profitable one may be had in the District Columbia, were the canal in operation, has already been demonstrated. It only remains then for the State of Pennsylvania to lend her aid, in proportion to the interest of her citizens, in this improvement; rightly considered there can be no collision of interests, no sectional jealousies excited between the citizens of Pennsylvania east, and those west of the mountains. The aggregate wealth of the State will be enhanced as you increase the motives to application and industry. This can only be done by providing a convenient market, at which the surplus productions of labor may be exchanged for the necessaries, the conveniences, and, if you please, the luxuries of life. That Pennsylvania will pursue a wise and liberal policy, as it relates to this great scheme of improvement, there cannot, in justice to that State, be reason to doubt; her willingness to improve the navigation of the Monongahela and Ohio rivers; her aid in establishing a hospital at New Orleans, and other measures of a similar nature, are evidences of a like disposition; and we may, therefore, as far as sound policy and wisdom will justify, count upon the immense resources of Pennsylvania as an auxiliary to the accomplishment of this undertaking—and from the State of Ohio, (whose rapid, but

steady march from infancy to manhood, has attracted the admiration of the world,) we may calculate upon similar countenance and aid—and when we find so many powerful States concerned, beside the District of Columbia, in the consummation of this work, when its extensive usefulness has been demonstrated, and its profits to the undertakers ascertained, and when a pledge has been given to complete it in a short time, and for a trifling sum compared with its importance, can there be any doubt of the necessity and propriety of losing no time in providing the means to commence and prosecute the work ? Much is yet to be said on this subject. Its advantages, in a national or political point of view, will hereafter be shewn, and some attempts made to point out the course by which the funds necessary may be raised without difficulty, to complete this object.

Mr. Fulton's Communication to Mr. Gallatin.

Sir : By your letter of the 29th of July, I am happy to find that the attention of Congress is directing itself towards the opening of communications through the United States, by means of roads and canals ; and it would give me particular pleasure to aid you with useful information on such works, as I have long been contemplating their importance in many points of view.

But a year has not yet elapsed since I returned to America, and my private concerns have occupied so much of my time that, as yet, I have acquired but very little local information on the several canals which have been commenced.

Such information, however, is perhaps at present not the most important branch of the subject, particularly as it can be obtained in a few months, at a small expense, whenever the public mind shall be impressed with a sense of the vast advantages of a general system of cheap conveyance.

I hope, indeed, that every intelligent American will, in a few years, be fully convinced of the necessity of such works to promote the national wealth and his individual interest. Such conviction must arise from that habit of reflection which accompanies the republican principle, and points out their true interest on subjects of political economy. From such reflections arise their love of agriculture and the useful arts, knowing them to augment the riches and happiness of the nation ; hence, also, their dislike to standing armies and military navies, as being the means of increasing the proportion of non-productive individuals, whose labor is not only lost, but who must be supported out of the produce of the industrious inhabitants, and diminish their enjoyments.

Such right thinking does great honor to our nation, and leads forward to the highest possible state of civilization, by directing the

powers of man from useless and destructive occupations, to pursuits which multiply the productions of useful labor, and create abundance.

Though such principles actuate our citizens, they are not yet in every instance, aware of their best interests; nor can it be expected that they should perceive at once the advantages of those plans of improvement which are still new in this country. Hence, the most useful works have sometimes been opposed; and we are not without examples of men being elected into the State legislatures for the express purpose of preventing roads, canals, and bridges, being constructed. But in such errors of judgment our countrymen have not been singular. When a bill was brought into the British parliament fifty years ago to establish turnpike roads throughout the kingdom, the inhabitants, for forty miles round London, petitioned against such roads; their arguments were, that good roads would enable the farmers of the interior country to bring their produce to the London market cheaper than they who lived nearer the city and paid higher rent; that the market would be overstocked the prices diminished, and they unable to pay their rent, or obtain a living. The good sense of parliament, however, prevailed: the roads were made, the population and commerce of London increased, the demand for produce increased, and he who lived nearest to London still had a superior advantage in the market.

In like manner, I hope the good sense of our legislature will prevail over the ignorance and prejudice which may still exist against canals. And here an important question occurs, which it may be proper to examine, with some attention, in this early stage of our public improvements,—whether, as a system, we should prefer canals to turnpike roads? Our habits are in favor of roads; and few of us have conceived any better method of opening communications to the various parts of the States. But in China and Holland, canals are more numerous than roads; in those countries the inhabitants are accustomed to see all their productions carried either on natural or artificial canals, and they would be as much at a loss to know how we, as a civilized people, could do without such means of conveyance, as we are surprized at their perseverance and ingenuity in making them.* England, France, and the principal States of Europe, commenced their improvements with roads: but, as the science of the engineer improved, and civilization advanced, canals were introduced, and England and France are now making every exertion to get the whole of their heavy productions water borne, for they have become sensible of the vast superiority of canals over roads.

Our system, perhaps, ought to embrace them both: Canals for the long carriage of the whole materials of agriculture and manufactures, and roads for travelling, and the more numerous communications of the country. With these two modes in contemplation, when public money is to be expended with a view to the greatest good, we should

* The royal canal from Canton to Pekin is 825 miles long, its breadth fifty feet, and its depth nine feet.

now consider which object is entitled to our first attention. Shall we begin with canals, which will carry the farmer's produce cheap to market, and return him merchandise at reduced prices? Or shall we first make roads to accommodate travellers, and let the produce of our farms, mines, and forests, labor under such heavy expenses that they cannot come to market?

To throw some light on this interesting question, I will base my calculations on the Lancaster turnpike road. There the fair experiment has been made, to penetrate from Philadelphia to the interior country, and the mode of calculation here given will serve for drawing comparisons on the utility of roads and canals, for all the great leading communications of America.

From Philadelphia to the Susquehanna at Columbia, is 74 miles; that road, if I am rightly informed, cost, on an average, 6,000 dollars a mile, or 444,000 for the whole. On it, from Columbia to Philadelphia, a barrel of flour, say 200 weight, pays one dollar carriage. A broad wheeled wagon carries 30 barrels of three tons, and pays for turnpike three dollars; thus for each ton carried, the turnpike company receives only one dollar.

I will now suppose a canal to have been cut from Philadelphia to Columbia, and with its windings to make 100 miles, at 15,000 dollars* a mile, or for the whole 1,500,000 dollars. On such canal, *one man*, *one boy* and *horse*, would convey 25 tons 20 miles a day,† on which the following would be the expenses:

One man, - - - - - -	1 00
One horse, - - - - - -	1 00
One boy, - - - - - -	50
Tolls for repairing the canal, - - - -	1 00
Tolls for passing locks, inclined planes, tunnels and aqueducts, - - - - - -	1 00
Interest on the wear of the boat, - - -	50
Total,	$5 00

This is equal to 20 cents a ton for 20 miles, and no more than one dollar a ton for 100 miles, instead of 10 dollars paid by the road. Consequently, for each ton carried from Columbia to Philadelphia on the canal, the company might take a toll of six dollars instead of one, which is now got by the road; and then the flour would arrive at Philadelphia for seven dollars a ton instead of ten, which it now pays. The merchandise would also arrive at Columbia from Philadelphia, for three dollars a ton less than is now paid; which cheap carriage

* On averaging the canals of America, 15,000 dollars a mile will be abundantly sufficient to construct them in the best manner, particularly if made on the inclined plane principle, with small boats, each carrying six tons.

† One horse will draw on a canal, from 25 to 50 tons, 20 miles in one day. I have stated the least they ever do, and the highest rate of charges, that no deception may enter into these calculations.

both ways would not only benefit the farmer and merchant, but would draw more commerce on the canal than now moves on the road, and thereby add to the profits of the company.

But to proceed with my calculations, I will suppose that exactly the same number of tons would move on the canal that are now transported by the road. Again, let it be supposed that at one dollar a ton the turnpike company gains five per cent. per annum on their capital of 444,000 dollars, or 22,200 dollars, consequently 22,200 tons must be carried, which at six dollars a ton to the canal company, would have given 133,200 dollars a year, or 8½ per cent. for their capital of 1,500,000 dollars.

The reason of this vast difference in the expense of carriage by roads or canals, will be obvious to any one who will take the trouble to reflect, that on a road of the best kind four horses, and sometimes five, are necessary to transport only three tons. On a canal one horse will draw 25 tons, and thus perform the work of 40 horses; the saving therefore is in the value of the horses, their feeding, shoeing, geer, wagons and attendance. These facts should induce companies to consider well their interest, when contemplating an enterprize of this sort, and what would be their profits, not only in interest for their capital, but the benefit which their lands would receive by the cheap carriage of manure and of their productions.

In considering the profit to accrue to a company from a canal instead of roads, there is another important calculation to be made, and for that purpose I will proceed with the Lancaster turnpike, supposing it to extend to Pittsburg, 320 miles. On which the carriage being at the rate now paid from Columbia to Philadelphia, that is ten dollars a ton for 74 miles, the ton from Pittsburg would amount to 42 dollars, at which price a barrel of flour would cost four dollars in carriage, an expense which excludes it from the market. Thus, grain, the most important and abundant production of our interior country, and which should give vigor to our manufactures, is shut up in the districts most favorable to its culture; or to render it portable and convert it into cash, it must be distilled to brutalise and poison society. In like manner all heavy articles of little moneyed value, can only move within the narrow limits of 100 miles; but were a canal made the whole distance, and by one or more companies, they might arrange the tolls in the following manner, so as to favor the long carriage of heavy articles.

The expense of man, boy and horse, as before stated, would cost only three dollars to boat one ton of flour three hundred miles, this is thirty cents a barrel; suppose then that the company receive seventy cents a barrel or seven dollars a ton, flour could then come from Pittsburg to Philadelphia for one dollar a barrel, the sum which is now paid from Columbia: thus the canal company would gain seven dollars a ton by a trade which could never move through a road of equal length. Here we see that on canals the tolls may be so arranged as to draw to them articles of little moneyed value, and it would be the interest of the company or companies to make such regulations.

But on turnpike roads no such accommodation of charges in proportion to distance can be effected because of the number of horses, which cannot be dispensed with.* Even were the roads made at the public expense and toll free, still the carriage of one ton for three hundred miles would cost at least thirty-five dollars. But were canals made at the public expense, and no other toll demanded than should be sufficient to keep them in repair, a ton in boating and tolls would only cost three dollars for three hundred miles; and for thirty-five dollars, the sum which must be paid to carry one ton three hundred miles on the best of roads, it could be boated *three thousand five hundred miles*, and draw resources from the centre of this vast continent.

But, striking as this comparison is, I will still extend it. The merchandise which can bear the expense of carriage on our present roads to Pittsburg, Kentucky, Tennessee, or any other distance of three hundred miles, and which for that distance pays one hundred dollars a ton, could be boated on canals *ten thousand miles for that sum.*

As these calculations are founded on facts which will not be denied by any one acquainted with the advantages of canals, it is the interest of every man of landed property, and particularly of the farmers of the back countries, that canals should be immediately constructed and rendered as numerous as the funds of the nation will permit, and the present population requires: and as inhabitants multiply most towards the interior and must extend westward, still moving more distant from the sea coast and the market for their produce, it is good policy and right that canals should follow them. In twenty-five years our population will amount to fourteen millions; two-thirds of whom will spread over the western countries. Suppose then that 3,500,000 dollars were annually appropriated to canals, such a sum would pay for three hundred miles of canal each year, and in twenty years we should have six thousand miles circulating through and penetrating into the interior of the different States; such sums, though seemingly large, and such works, though apparently stupendous are not more than sufficient to keep pace with the rapid increase of our population, to open a market and carry to every district such foreign articles as we near the coast enjoy. With this view of the subject, arises a political question of the utmost magnitude to these states—which is—

That as our national debt diminishes, and the treasury increases in surplus revenue. will it not be the best interest of the people to continue the present duties on imports, and expend the products in national improvements?

To illustrate this question, I will state some examples of the rate of duties and the expense of carriage, to prove that, by keeping on the duties and making canals, with the revenue, goods, in a great

* In my work on small canals, published in 1796, page 140, there is a table shewing a mode of regulating the boating and tonnage in such manner, that a ton may be transported thirteen hundred miles for five dollars. Yet by this method canal companies would gain more toll than by any other means yet practised.

number of instances, will be cheaper to the consumer, than by taking off the duties, and leaving the transport to roads.

FIRST EXAMPLE:

Brown sugar pays in duty, two and a half cents a pound, or for 100 pounds - - - - -	$2 50
It pays for wagoning 300 miles - - - -	5 00
Total	$7 50

By the canal, it would cost in boating 15 cents for 300 miles; consequently, the boating and duty would amount to $2 65; therefore, by keeping on the duty and making canals, sugar would arrive at the interior, 300 miles, for $2 35 the hundred weight cheaper than if the duties were taken off and the transport left to roads.

SECOND EXAMPLE:

One bushel of salt, weighing 56 pounds, paid in duty -	$ 0 20
To carry it 300 miles by roads, the expense is - -	2 50
Total -	$ 2 70

By the canal it would cost for boating 300 miles, seven and a half cents. By keeping on the duties and making the canals, it would arrive to the interior consumer at $2 32½ the bushel cheaper than were the duties taken off, and the transport left to roads.

THIRD EXAMPLE:

Molasses pays five cents a gallon duty, this is for 100 pounds	$ 0 75
It pays for wagoning 300 miles - - - -	5 00
Total -	$ 5 75

By the canal the carriage would cost fifteen cents, and it would arrive at the interior at $4 10 the hundred weight, or 27 cents a gallon cheaper than were the duties taken off, and the transport left to roads.

Numerous other articles might be stated to shew that the real mode of rendering them cheap to the interior consumer, is to keep on the duties and facilitate the carriage with the funds so raised. These, however, may be considered as partial benefits, and not sufficiently general to warrant keeping on the duties. But there is a point of view in which I hope it will appear that the advantages are general, and will be felt throughout every part of the States. It is by reducing the expense of all kinds of carriage, and thus economise to each individual more than he now pays in duty on the foreign articles which he consumes.

FOR EXAMPLE:

Wood, for fuel, is an article of the first necessity; it cannot bear the expense of transport twenty miles on roads; at that distance it is shut out from the market, and the price of fuel is consequently raised the amount of the carriage; were a cord of wood carried twenty miles on roads, it would pay for wagoning at least three dollars; on a canal it would pay twenty cents; thus, on only one cord of wood, there is an economy of $2 80; which economy would pay the duty on fourteen pounds of tea, at twenty cents the pound, duty;

Or 140 pounds of sugar, at two cents the lb. duty;

Or 56 pounds of coffee, at five cents the lb. duty;

Or 14 bushels of salt, at twenty cents the bushel duty;

Or 56 gallons of molasses, at five cents the gallon duty.

I will now suppose a city of 50,000 inhabitants, who for their household and other uses will consume 50,000 cords a year, on which there would be an economy of 140,000 dollars, a sum in all probability equal to the duties paid by the inhabitants. For the duties divided on the whole of the American people, are but $2 28 to each individual. Here I have estimated each person to pay $2 80, yet this estimate is made on one cord of wood to each inhabitant of a city; were I to calculate the economy on the carriage of building timber, lime, sand, bricks, stone, iron, flour, corn, provisions, and materials of all kinds which enter or go out of a city, it would be five times this sum; and thus the towns and cities are to be benefited. The farmer or miller who lives 20 miles from a market, pays at least 22 cents to wagon a barrel of flour that distance; by the canal it would cost two cents; the economy would be 20 cents; at 100 miles the economy would be 100 cents, and at 150 miles it would be 150 cents; beyond this distance flour cannot come to market by roads; yet at this distance the economy of 150 cents on the carriage of one barrel of flour would pay the duty on

7½ pounds of tea;

Or 75 pounds of sugar;

Or 30 pounds of coffee;

Or 7½ bushels of salt;

Or 30 gallons of molasses.

Thus it is, that the benefits arising from a good system of canals are general and mutual. Therefore should peace and the reduction of the national debt give an overflowing treasury, I hope you, and the majority of the Americans, will think with me, that the duties should not be taken off nor diminished; for such an act, instead of relieving the people, would really oppress them, by destroying the means of reducing the expense of transport, and of opening to them a cheap mode of arriving at good markets.

To proceed with these demonstrations, let us look at the rich productions of our interior country:

Wheat, flour, oats, barley, beans, grain, and pulse of all kinds;

Cyder, apples, and fruits of all kinds;

Salt, salted beef, pork and other meats ;*
Hides, tallow, bees-wax ;
Cast and forged iron ;
Pot and pearl ashes, tanners' bark ;
Tar, pitch, rosin, and turpentine ;
Hemp, flax, and wool ;
Plaister of Paris, so necessary to our agriculture ;
Coals, and potter's earth for our manufacturers ;
Marble, lime, and timber for our buildings.

All these articles are of the first necessity, but few of them can bear the expense of five dollars the hundred weight to be transported 300 miles on roads. Yet on canals they would cost in boating only fifteen cents the 100 weight for that distance.

There is another great advantage to individuals and the nation, arising from canals, which roads can never give. It is that when a canal runs through a long line of mountainous country, such as the greater part of the interior of America, all the ground below for half a mile or more may be watered and converted into meadow and other profitable culture.

How much these conveniences of irrigation will add to the produce of agriculture and the beauties of nature, I leave to experienced farmers and agricultural societies to calculate.

In Italy and Spain it is the practice to sell water out of the canals, for watering meadows and other lands. In such cases tubes are put into the canal, under the pressure of a certain head of water, and suffered to run a given time for a fixed price; the moneys thus gained add much to the emoluments of the canal companies.

But, with all these immense advantages which canals give, it may be a question with many individuals whether they can be constructed in great leading lines from our seacoast and navigable rivers to the frontiers of the several States, or pass our mountains and penetrate to the remote parts of our interior country. Should doubts arise on this part of the plan, I beg leave to assure you that there is no difficulty in carrying canals over our highest mountains, and even where nature has denied us water. For water is always to be found in the valleys, and the canal can be constructed to the foot of the mountain, carrying the water to that situation. Should there be no water on the mountain, or its sides, there will be wood or coals, either or both of which can be brought cheap to the works by means of the canal. Then, with steam engines, the upper ponds of canal can be filled from the lower levels, and with the engines the boats can, on inclined planes, be drawn from the lower to the upper canal. For this mode of operating it is necessary to have small boats of six tons each. As the steam engines are to draw up and let down the boats on inclined planes, no water is drawn from the upper level of canal, as when locks are used. Consequently, when the upper ponds have

* Animals are now driven to market 300 or more miles, at a considerable expense and loss of flesh, for two principal reasons: first, the expense of transporting the salt to the interior; and, second, the expense of carrying the salted meats to market.

been once filled, it is only necessary that the engine should supply leakage and evaporation. There is another mode of supplying the leakage and evaporation of the higher levels: On the tops and sides of mountains there are hollows or ravines which can be banked at the lower extremity, thus forming a reservoir to catch the rain or melted snow. From such reservoirs the ponds of a canal can be replenished in the dry months of summer. This mode of reserving water is in practice in England for canals, and in Spain for irrigation. In this manner I will suppose it necessary to pass a mountain 800 feet high; then four inclined planes, each of 200 feet rise, would gain the summit, and four would descend on the other side: total 8 inclined planes and 8 steam engines. Each steam engine, of 12 horse power, would cost about 10,000 dollars, in all 80,000 dollars; each would burn about 12 bushels of coal in 12 hours, or 96 bushels for the eight engines for one day's work.

The coals in such situation may be estimated at 12 cents a bushel, or - - - - - -	$11 52
At each engine and inclined plane there must be five men; total 40 men, at one dollar each - - -	40 00
Total	$51 52

For this sum they could pass 500 tons in one day over the eight inclined planes, which for each ton is only -	10 cents
Suppose the mountain to be 20 miles wide, boating for each ton would cost - - . - - -	20 cents
Total	30 cents

a ton for passing over the mountain, which will be more or less, according to circumstances; these calculations being only intended to remove any doubts which may arise on the practicability of passing our mountains.

Having thus, in some degree, considered the advantages which canals will produce in point of wealth to individuals and the nation, I will now consider their importance to the Union and their political consequences.

First, their effect on raising the value of the public lands, and thereby augmenting the revenue.

In all cases where canals shall pass through the lands of the United States, and open a cheap communication to a good market, such lands will rise in value for twenty miles on each side of the canal. The farmer who will reside twenty miles from the canal, can in one day carry a load of produce to its borders; and, were the lands 600 miles from one of our seaport towns, his barrel of flour, in weight 200 lbs. could be carried that distance for 60 cents, the price which is now paid to carry a barrel 50 miles on the Lancaster turnpike. Consequently, as relates to cheapness of carriage, and easy access to market, the new lands, which lie 600 miles from the seaports, would be of equal value with lands of equal fertility which are fifty miles from

the seaports. But not to insist on their being of so great value until population is as great, it is evident that they must rise in value in a three or four fold degree, every lineal mile of canal would accommodate 25,600 acres. The lands sold by the United States in 1806 averaged about two dollars an acre, and certainly every acre accommodated with a canal would produce six dollars. Thus, only 20 miles of canal each year, running through national lands, would raise the value of 512,000 acres at least four dollars an acre, giving 2,048,000 dollars to the Treasury, a sum sufficient to make 136 miles of canal. Had an individual such a property, and funds to construct canals to its centre, he certainly would do it for his own interest. The nation has the property, and the nation possesses ample funds for such undertakings.

Secondly, on their effect in cementing the union, and extending the principles of confederated republican government. Numerous have been the speculations on the duration of our union, and intrigues have been practiced to sever the western from the eastern States. The opinion endeavored to be inculcated, was, that the inhabitants beyond the mountains were cut off from the market of the Atlantic States; that, consequently, they had a separate interest, and should use their resources to open a communication to a market of their own; that remote from the Seat of Government, they could not enjoy their portion of advantages arising from the union, and that, sooner or later, they must separate and govern for themselves.

Others, by drawing their examples from European governments, and the monarchies which have grown out of the feudal habits of nations of warriors, whose minds were bent to the absolute power of the few, and the servile obedience of the many, have conceived these States of too great an extent to continue united under a republican form of government, and that the time is not distant when they will divide into little Kingdoms, retrograding from common sense to ignorance, adopting all the follies and barbarities which are every day practised in the Kingdoms and petty States of Europe. But those who have reasoned in this way, have not reflected that men are the creatures of habit, and that their habits as well as their interests may be so combined, as to make it impossible to separate them without falling back into a state of barbarism. Although in ancient times some specks of civilization have been effaced by hordes of uncultivated men, yet it is remarkable that since the invention of printing and general diffusion of knowledge, no nation has retrograded in science or improvements; nor is it reasonable to suppose that the Americans, who have as much, if not more, information in general, than any other people, will ever abandon an advantage which they have once gained. England, which at one time was seven petty kingdoms, has by habit long been united into one. Scotland by succession became united to England, and is now bound to her by habit, by turnpike roads, canals, and reciprocal interests. In like manner all the counties of England, or departments of France, are bound to each other; and when the United States shall be bound together by canals, by

cheap and easy access to market in all directions, by a sense of mutual interest arising from mutual intercourse and mingled commerce; it will be no more possible to split them into independent and separate governments, each lining its frontiers with fortifications and troops, to shackle their own exports and imports to and from the neighboring States, than it is now possible for the government of England to divide and form again into seven kingdoms.

But it is necessary to bind the States together by the people's interests, one of which is to enable every man to sell the produce of his labor at the best market and purchase at the cheapest. This accords with the idea of Hume, "that the government of a wise people "would be little more than a system of civil police; for the best inter- "est of man is industry and a free exchange of the produce of his la- "bor for the things which he may require."

On this humane principle, what stronger bonds of union can be invented than those which enable each individual to transport the produce of his industry 1,200 miles for 60 cents the hundred weight? Here then is a certain method of securing the union of the States, and of rendering it as lasting as the continent we inhabit.

It is now eleven years that I have had this plan in contemplation for the good of our country. At the conclusion of my work on small canals, there is a letter to Thomas Mifflin, then governor of the State of Pennsylvania, on a system of canals for America. In it I contemplated the time when "*canals shall pass through every vale, wind* "*round each hill and bind the whole country together in the bonds of so-* "*cial intercourse;*" and I am now happy to find that, through the good management of a wise administration, a period has arrived when an overflowing treasury exhibits abundant resources, and points the mind to works of such immense importance.

Hoping speedily to see them become favorite objects with the whole American people,

I have the honor to be,

Your most obedient,

ROBERT FULTON.

To ALBERT GALLATIN, Esq.

Secretary of the Treasury.

Washington, *December* 8, 1807.

REPORT

Of the Committee of the District of Columbia, to whom were referred sundry memorials from the inhabitants of Pennsylvania, Maryland, and Virginia, praying the aid of the Federal Government towards the improvement of the navigation of the river Potomac.

MAY 3, 1822.

The Committee of the District of Columbia, to whom were referred sundry memorials from the inhabitants of Pennsylvania, Maryland, and Virginia, praying the aid of the Federal Government, towards the improvement of the navigation of the river Potomac, have, according to order, attentively considered the object of the memorialists, and beg leave to submit to the House of Representatives, in relation thereto, the following Report:

That, by the concurrent acts of the Legislatures of Maryland and Virginia, a company were incorporated in the year 1784, on the recommendation of General George Washington, for the improvement of the navigation of the river Potomac, and its principal branches, above tide water. The 17th and 18th sections of this act prescribed the conditions upon which the tolls granted to the company should be exacted, and a limitation to the duration of their charter. By a supplementary act, those conditions were modified, and the period limited for the completion of the navigation of the river, in the mode prescribed, has been, from time to time, extended by subsequent laws of Maryland and Virginia.

No legal inquiry has ever been regularly executed, so far as your committee are informed, in order to ascertain whether the "Potomac Company have complied with the terms of their charter." After the expenditure of their subscribed stock, to the amount of 311,555 dollars; of the tolls of more than twenty years collection; and, of the farther sum of 174,000 dollars, borrowed, by the company, of the State of Maryland, of the banks of the District of Columbia, and of private individuals, it is universally acknowledged, that the navigation of the river is most defective.

In all this period, the stockholders have received but one inconsiderable dividend; and their stock will not command, in the market, where, however, it is seldom found, a moiety of its nominal value.

It is, in fine, now ascertained, that, without further and very considerable aid from the States immediately interested in the navigation of the Potomac, or from the general government, the great object sought to be attained by the improvement of that navigation, a commercial intercourse, through this channel, between the western and Atlantic States, will be entirely defeated.

Will the Congress of the United States interpose, and have they the power to prevent a result so deplorable?

A hasty survey of the general map of the United States, and a brief recurrence to the theory and policy of the Federal Government,

with their practical illustration by the structure of the Cumberland road would seem almost to supersede the necessity of any comment, from your committee, on the importance of the navigation of the Potomac, or the power of Congress to provide for its improvement.

One of its southern branches, itself a considerable river, rises to the southwest of Staunton, in Virginia, and is capable of connecting, by a navigable canal, the geographical centre of that State, in territory the largest of the Union, with the market towns of the District of Columbia. Emptying into the Potomac above the chief obstructions of its navigation, the Shenandoah, like those navigable streams which descend from the northwest, through the limestone valleys of Maryland and Pennsylvania, depends, for an outlet to the ocean, on the improvement of the navigation of the main river, to a considerable distance above tide water. These branches, when the stem shall have been improved, are capable of affording, with the Potomac, an internal water communication exceeding, in extent, 650 miles.

The value of this navigation to the ample and fruitful territory washed by the tide, or drained by the tributary streams of this noble river, a territory comprehending four counties of Pennsylvania, seven of Maryland, and eighteen of Virginia, exceeding, in extent and population, some of the largest States of the Union, should not be disregarded. It sinks, however, into comparative insignificance, when this river is contemplated as a necessary link of the shortest chain of communication between the Atlantic and western states. The enlightened policy which seated the Federal Government on the banks of the Potomac, indicates its peculiar adaptation to this purpose; and nature has facilitated its accomplishment, by a rupture of the many ranges of lofty mountains, including even the great ridge of the Alleghany, in the direction which such a purpose requires. It is no longer questionable but that the head waters of the Ohio may be mingled with those of the Potomac, by a tunnel, or subterranean canal, not exceeding two miles in extent; and the produce of the soil and industry of the west, after ascending the Youghiogany, find a safe and commodious channel; thence, to the valley of Savage Creek, and, through it, the north branch, and the main river, to the Chesapeake and the Atlantic.

The patriotism which exults in the approaching connexion of the Hudson with the northern lakes; in the efforts of the Carolinas and Virginia, to unite, by short portages, the sources of the Santee and Pedee with those of the Tennessee, and of the Roanoke and James rivers with the Great Kenawha, cannot but regard this central river of the Union with peculiar interest.

Notwithstanding all its claims to general favor, the Potomac is, however, exposed to the serious disadvantage of being, throughout its whole course, the common boundary of States, whose enterprize and resources are attracted to other objects of internal improvement, some or all of which are rivals of this; and all its markets, once the property of those States, are, by the cession of the District of Columbia

to the General Government, confided to the exclusive guardianship of Congress.

With an almost boundless authority over the District of Columbia, the government of the United States acquired new, urgent, and daily increasing interests in the navigation of the Potomac.

In the rapid improvement, and consequent security of the seat of the Federal government from foreign danger, are involved, not only the preservation of the property and lives of its inhabitants, the accommodation and comfort of its numerous public functionaries, but, in no small degree, the national character and honor. The most deplorable calamity of the late war, would doubtless have been averted, had the Capital of the United States been encompassed by the dense population of a large city, by such a population as would unquestionably succeed the contemplated improvement of the navigation of the Potomac. And, if sordid views may be allowed to mingle with considerations of such inestimable consequence, it may be added that, with the growth of the numbers and opulence of a great commercial emporium, would of necessity arise a corresponding appreciation of the value of all the disposable public lands in the city of Washington, consisting of more than 5,000 vacant lots, and now computed at near 2,000,000 dollars, it is not unreasonable to suppose, that their value would be quadrupled, by a prospect of their early occupation and improvement.

Your committee are aware that this calculation may be, indeed has been, impugned, by referring to the value of the commodities which have hitherto descended the Potomac. The very origin of this report, in the present imperfect and hazardous navigation of the river, suggests an *answer* to this objection. It may be corroborated by another; the tolls of a single turnpike, in length but 34 miles, leading to the town of Alexandria, have exceeded, in one year, 25,000 dollars, or very near a fourth of the annual interest of a sum sufficient to complete the navigation of the Potomac, from its tide water to the Cumberland road. This great and costly work, itself so honorable to the wisdom and beneficence of the United States, awaits this improvement to yield all that it has promised to the Union.

If the relative expense of transportation, by land, and by water, be properly estimated, the completion of a canal, from the tide to Cumberland, would have the effect of approximating the seat of government to within a few miles of the Alleghany; while the extension of this canal, at some future period, would occasion that formidable barrier to disappear in the intercourse of the eastern and western states. It is, by such a canal, that your committee propose to supply the place of the present defective navigation of the Potomac. As this river affords the shortest water line of communication between the tide of the sea and the eastern base of the Alleghany, so is its current the most rapid, when compared with that of the other great rivers which have their sources in this chain of mountains. Wherever the science of civil engineering has been long and successfully applied to inland navigation, your committee are assured that the use of the natural beds

of wide and rapid rivers has been superseded by a resort to navigable canals, extending along their margin, and fed by their currents, until met by the tide. Without a recourse to this expedient, the ascent of the Potomac, by a loaded boat, cannot be overcome, it is believed, at an expense less than that which attends the transportation of equal burthens, over like distances, along the ordinary roads of the adjacent country. The consequence must be, that every downward cargo is chargeable with double freight, exclusive of insurance against the repeated hazard to the boat, and the lives of those who guide it, of total destruction.

From a navigation so impeded and so dangerous, all bulky commodities are, of necessity, excluded, and yet it is from the transportation of such articles that the chief part of the revenue of any canal is derived. In the table of tolls, annexed to this report, it is apparent that the entire estimate of the commodities which ascend the Potomac, although they comprise a greater value in less bulk, bears but a very small proportion to the amount of those which descend the river; while these must be regarded as of very inconsiderable value, when compared with the numerous and diversified productions of the extensive and fertile country which should find its market on the banks of this river.

Can it be owing to any other cause than the defective navigation of the Potomac, that the buildings of Washington are cemented with the lime of Rhode Island, and warmed, in winter, with the mineral coal of James river? The last is dug and raised at much cost, transported twelve miles over land to the port of shipment, and, thence conveyed by a circuitous navigation of 500 more, to the District of Columbia. The former is calcined by fuel of a value, enhanced by its scarcity, and its vicinity to a market, in which it is applied to various uses, and it is afterwards transported even farther than the latter, with the superior hazard of the sea, augmented not a little by the peculiar character of the commodity itself. What would be the tolls upon the transportation of these necessary and bulky commodities, beds of which, inexhaustible in quantity, and excellent in quality, are found in the vicinity of each other, near the surface of the earth, and on the very margin of the Potomac, if a navigable canal connected Cumberland with Washington; and how rapidly would the demand for them increase with the progress of the population and wealth of the markets of the Chesapeake! The consumption of salt, by which the east would pay, in part, for these valuable minerals of the west, in the extensive grazing country of the Alleghany and its parallel ridges, would give increased activity and profit to this intercourse. In the channel of communication between the works of Onondaga and the waters of the Ohio, this heavy commodity is now subjected to a most circuitous water conveyance, by vessels of different capacities and drafts, and that transportation itself is interrupted by several portages.

Iron every where abounds, and copper has already been found in the mountains drained by the Potomac. Their valleys yield luxuri-

ant crops of hemp and flax, and the forests of oak and pine which climb their summits, are destined, it is to be hoped, to supply future navies with the means of raising the blockade of the Chesapeake.

It was by this channel of intercourse, imperfect as it now is, that during the late war, Louisiana supplied the Atlantic States with sugar; Tennessee with cotton; and Kentucky with salt-petre, that necessary material of defence. Were this communication as perfect as it can be rendered, an enemy, who succeeded in closing the mouth of the Mississippi, in order to paralyze the industry of the west, would have, also, to win, from the fleets of the Union, the possession of the Chesapeake. Through this channel, in case of war with a formidable naval power, the west would not only supply the east with the valuable products of the Mississippi, but make its return for the wines of Africa, and the various manufactures of Europe and Asia, in the cloths of Steubenville, and the cutlery and glass of Pittsburg. Should such a war be as extensively conducted on the land as on the ocean, the cost of the contemplated canal would be saved by the United States in a single campaign.

Your committee are aware that other channels of communication across the Alleghany may be greatly improved, and rendered tributary to the general welfare of the United States, both in peace and war; in the latter, by the additional security which they would afford to the commerce of the interior, and by the vigor which they would impart to all the operations of the Federal Government for the common defence. On the other hand, it will readily be conceded, notwithstanding the preference which may be given, by local interests, to other objects of internal improvement, that, whatever facilitates the commercial, social, and political, connexion between the remote extremes and the seat of the General Government of so vast a republic as the United States, must have the same propitious influence as would result, were it otherwise practicable, from contracting the extent of its territory without reducing the number, impairing the wealth, or abridging the comfort and happiness of its people. To all the friends of liberty in America, who regard the state governments as essential parts of a republican system, erected on a scale so broad as to create alarm for its duration, or who, with no less truth, regard the union of those States as the bond alike of their freedom and independence, *every measure* which has the effect of diminishing the extent of the one, while it multiplies and strengthens the ties of the other, must be viewed with earnest solicitude. But, another inquiry remains —Has Congress the power to insure *its* success?

So numerous and so various are the benefits accruing to every nation from inland navigation, so urgently have the United States been invoked by the character and genius of their institutions to diffuse their advantages over a territory which nature has eminently fitted to receive them, that a former Congress sanctioned, by their voice, a system of internal improvement co-extensive with the wants of the nation.

Your committee are not unmindful of the impediment which arrest-

ed the progress of that system, and could not expect success in their present effort in behalf of one of its objects, if the propositions which they are about to submit to the House of Representatives were liable to similar objections. The committee have studiously sought to guard against their application, and confidently hope that they will be found to have succeeded.

Two proposals have already been offered to the House, in the course of the present session of Congress, by the Committee on Roads and Canals, in relation to the Potomac. Neither of them interferes with the plan for the improvement of the navigation of that river, which this committee have presumed to recommend. One of them, embraced by a resolution for the appointment of commissioners to survey the route and estimate the expense of a navigable canal, seems to your committee to be, in a great degree, superseded by the report of the principal Engineer of Virginia to the Board of Public Works of that State; and, as an incorporated company already exists, with ample authority to make the contemplated improvement, there does not remain any apparent necessity of waiting for the prosecution of this work, until a more extensive system of internal improvement be devised by Congress.

The committee simply recommend the combination of the proceeds of sales of the public property in the City of Washington, which, according to the original plan of the city, was designed to be sold, with such sums of money as the Legislatures of Maryland and Virginia and the citizens of those and of the adjacent states may voluntarily subscribe, for the purpose of extending a navigable canal from the foot of the Little Falls of the Potomac, to the commencement of the Cumberland road. They propose to annex to this public and private subscription, the condition, that the Potomac Company shall previously assent, with the approbation of the Legislatures of Maryland and Virginia, to such alterations of their present charter as will admit the United States, those states, themselves, already interested in the stock of the company, and the new subscribers, to participate, on fair and equitable principles, in their future revenue. These alterations would, among other obvious effects, provide for the payment of the debts of the company, and for the reduction of the nominal, by some liberal reference to the actual value of their present stock.

In order to obviate the necessity of selling the public lots in the City of Washington, before the contemplated improvement of the navigation and commerce of the District of Columbia shall have caused the anticipated appreciation of their value, as well as to complete the canal in the shortest possible time, without drawing immediately for large sums, upon the public Treasury, the States of Maryland and Virginia, and the individual subscribers of new stock, your committee propose, that the United States shall borrow, on the public faith, and a specific pledge of all the public lots reserved for sale, a sum, receivable in semi-annual instalments, sufficient to complete the entire work in three years, from the date of the first instalment.

Referring to the report of the Chief Engineer of Virginia, and computing the total cost of the contemplated canal at two million and a half of dollars, your committee recommend that an amount of stock, in the capital of the Company, not exceeding half a million, be reserved to pay the debts of the Potomac Company, and to reimburse the present stockholders, including the States of Maryland and Virginia; and that the above loan be limited to two millions of dollars, and applied to defray the expense of the additional works required to complete the canal.

Your committee have reason to believe that two millions of United States stock, bearing an interest of four per cent. payable semi-annually, and irredeemable for twenty-eight years, could be sold in Europe, or America, at par. To provide for the payment of the interest and the final reimbursement of the principal of this debt, it is proposed, that the United States shall subscribe one million of dollars to the stock of the Potomac Company, on the conditions already suggested, the States of Maryland and Virginia six hundred thousand dollars, and individuals the remaining four hundred thousand; that, on the stock thus subscribed, there shall be charged an annuity for twenty-eight years, of six per cent. per annum, payable semi-annually; four per cent. of which shall be applicable to the payment of the interest on the two million loan, and two per cent. to the creation of a sinking fund, to be invested, from time to time, as received, in productive stock, in order to provide for the redemption of the principal of the loan, at the expiration of twenty-eight years.

Such is the scheme which the committee presume to recommend for extricating the Potomac Company from their present embarrassments, and accomplishing a work which, unassisted, they cannot effect, although of inestimable importance to the public,

Complicated as this scheme may, at first, appear, it involves, in its prosecution, the exercise of no other powers on the part of Congress than, 1st, the power of selling the public lots in the City of Washington, which were acquired expressly for sale. 2dly. That of borrowing money on the public faith, and a specific pledge for its repayment; and, lastly, the application of the public treasure to an object of general welfare; or the investment of it in the stock of an incorporated company, expected to yield an annual income.

The committee will not swell this report, already too far extended, by arguments to demonstrate that all these powers are vested by the constitution in the Congress of the United States, either expressly, or by natural implication. They involve neither the incorporation of a private company, nor the condemnation of the lands of individuals, within the territory of any state, for national purposes. They do not extend the jurisdiction of the General Government over the persons or property of the citizen, nor purpose to derive, from the assent of any one or more states, any power which has not been granted to the Federal Government, by the people of the United States.

Your committee forbear to answer all the objections which this, like any other plan of internal improvement, may be expected to encounter.

They are contented to set against such objections some of its peculiar advantages; that, connected with the Cumberland road, it will complete a great national object, calculated to perpetuate the Union, and to promote the prosperity and glory of the United States; that, while it accomplishes this object in the short compass of three years, its cost will be distributed over the revenue of eight and twenty; that this cost will be greatly reduced by the credit which enables the American Government to negotiate its loans at so low a rate of interest as four per cent.; that, by the completion of the entire work in so short a period, that loss of interest on unproductive stock, which most canal companies have encountered, and which, in some similar enterprizes, has exceeded the principal of their stock, will be prevented; that, if the dividends of the Potomac Company shall, after the completion of the canal, yield six per cent. per annum to the stockholders, they will, from that moment, have nothing further to pay for their stock; and, after the lapse of twenty-eight years, or, possibly, a shorter period, they will be found to have paid but nine per cent. of its par value, for a property which, in all human probability, will have more than doubled that value. One of the most prominent and best features, perhaps, of this plan, for accomplishing an object of general welfare, is, that it combines, in its execution, private with public wealth, and thus effects such a co-operation of individual interest with public good, as will insure, in the original construction as well as the subsequent repairs of the canal, vigilance, economy, and fidelity, in all the disbursements of money, qualities so often required in vain, in the expenditure of public money, on public account.

Should the loan, on which this plan eventually depends, be negotiated abroad, it will be, because it leaves for more profitable application, in America, the sum which it is designed to withdraw from other channels of wealth and enterprize. If it charge a debt upon posterity, it must be again repeated, that it is to complete a work, as durable as that Union to which the people of America must look, now and hereafter, for the security of all their political and social happiness. Your committee submit the following resolution:

Resolved, That the Committee of the District of Columbia be instructed to report a bill in conformity with the principles contained in the preceding report.

Extracts from Mr. Shriver's work on the Chesapeake and Ohio, and other Canals.

THE ADVANTAGES OF CANAL OVER LAND TRANSPORTATION.

Although this subject is not strictly comprehended within the design of this work, it is nevertheless believed, that some notice of it will not be altogether unacceptable. The Maryland and Virginia commissioners, appointed to survey the Potomac, estimated the comparative advantages minutely, as appears by the following statement extracted from their report.

The amount of toll on a ton of merchandise, being stated at one cent per mile, and the freight also at one cent per mile, and eight men, and eight wagons, and forty horses being the number required to transport the burthen of one boat, drawn by one horse, and managed by a man and a boy, viz: 25 tons. Assume, then, equal rates of expense, as the basis of calculation: Say, for example, they each proceed one hundred miles; the wagons by land, and the boat by canal, and each travel twenty miles a day, carrying 25 tons of goods; the expenses of one wagon per day, say, is, for one man one dollar, for five horses five dollars, that is $ 6 00.

The expenses, then, of eight wagons, eight men, and forty horses, is, per day, - - - -	$ 48 00
The boat, at the same rates, is, for one man, one dollar, one boy, fifty cents, and a horse one dollar, each day, - - - - - -	2 50
It requires five days, at the rate of travelling assumed, to perform the trip of one hundred miles; five times the daily expenses of wagons, is - - -	240 00
Five times the daily expenses of the boat, is - -	12 50
The difference in the cost of freight of 25 tons by land, or water, free from toll, is, - - -	$ 227 50
Next add the interest on the out-fit for land carriage, and the same for the boat, &c. A wagon cost, when new, say $ 100, then eight wagons cost $ 800, and forty horses, each $ 100, amount together to -	4,800 00
The gear of five horses, when new, say, cost $ 50, and of forty horses, therefore, is, - - -	400 00
	$ 5,200 00
A boat, seventy feet long, ten feet wide, say, will cost $ 150, and the horse and gear $ 110, that is for canal out-fit, - - - - - -	260 00
Difference, - -	$ 4,940 00
The annual interest on $ 4,940, at six per cent, is	$ 296 40

A wagon, it is supposed, cannot last in service on the road more than eight years without repairs, then the rate of the wear of a wagon, may be stated per annum, at one eighth of the cost.

For repairs of each wagon per annum, - -	$ 12 50
Horses in constant use, in heavy draft, it is supposed, cannot be fit for service more than five years on an average, then one-fifth of the cost is the allowance for loss of horses; this for five horses, is equal to -	100 00
A horse in service will require a new set of shoes every two months; this, for five horses, makes the wear of shoes, - - - - - -	30 00

The gear of five horses is worth, new. $50, and will last on an average, say. five years; then we may add for this item of wear per annum. for each, - -	10 00
At these rates calculate the difference.	
The interest on the out-fit of eight wagons, and forty horses, after deducting the cost of boat and horse,	296 40
Wear of eight wagons, each & 12 50, is - -	100 00
Wear of forty horses as above, - - -	800 00
Shoes for forty horses above, - - - -	240 00
Wear of gear as above, - - - -	80 00
	$1,516 40
The cost of the boat and horse having been deducted from the sum on which interest is taken, no interest is therefore charged here; a boat will surely last longer than a wagon in service, but we will state it at the same, that is eight years, then take one-eighth of 150, the first cost for the wear of a boat per annum,	$18 75
Wear of one horse, - - - - -	20 00
Shoes for one horse, as above, - - -	6 00
Wear of gear, as above, - - - -	2 00
	$46 75
Difference in wear and interest in one year,	$1.469 65

To understand this difference more exactly, let the expenses per day, for five days, as above, on each kind of transportation, be added to a proportion of the sum of the annual wear and interest, equal to five days.

Expenses of eight wagons, &c. per day, - -	$240 00
$1,516 and 40 cents, divided by 73, gives the wear, interest, &c. for five days, viz. - - -	20 77
Entire expenses of wagons, per day, - - -	$260 77
Same expenses, for same time, of the boat, &c. is, -	$12 50
$46 and 75 cents divided by 73, is - - -	64
Entire expense of boat, &c. per day, - - -	$13 14

The sums total of the expense of each mode, divided by each other, viz: $260 77 by $13 14, shews that the expenses of land carriage may be stated, in round numbers, at twenty times the cost of transportation by water; besides changing the employments of the supernumerary carriers, in extensive districts of country, from the unproductive to the productive classes of citizens.

The disadvantage of land transportation in this statement, so strikingly displayed, is experienced, and every where acknowledged. A

report on internal improvements, made by Mr. Knight, in the legislature of Pennsylvania, states, "that the amount to be paid to wagoners, for transporting goods to Pittsburg, Wheeling, and some of the smaller towns, in the western part of Pennsylvania and Virginia, will, in a very few years, average at least one million and a half of dollars per annum, unless, indeed, some cheaper mode be in the meantime devised." The correctness of this estimate is corroborated by statements made upon the floor of Congress;* and perhaps confirmed by a letter from an intelligent and respectable mercantile house in Wheeling, which states that during the year 1822, they had consigned to them 1,081 wagons laden with merchandise, averaging about 3,500 pounds each, the carriage of which amounted to $90,000. Three-fourths of the wagons, it was supposed, obtained return loading from Wheeling. There are, besides the house from whom the information is derived, five other commission stores in Wheeling; estimating that each of these received two thirds the quantity of goods consigned to the first, it shows that 4,684 loads of merchandise were received at that town during the year mentioned. This number, at the rate of $90,000 for 1,081 loads, gives for the cost of transporting merchandise from Baltimore to Wheeling, the sum of *three hundred and ninety thousand dollars during one year:* add to this sum, for return loading, only one half, instead of three-fourths, the amount estimated, and the amount paid for transportation is shown to be *five hundred and eighty-five thousand dollars.*

* EXTRACT FROM MR. STEWART'S SPEECH IN CONGRESS.

"It has been ascertained," said Mr. S. "that the sum paid in Pittsburg alone, in one year, for the transportation of goods for the supply of Ohio, Kentucky, &c. had amounted to $1,500,000 The difference in the cost of transportation by canals and by land, has been ascertained to be as twenty to one. This was, he believed, a common result, to which all writers on the subject had come, and which was confirmed by the use of canals wherever adopted; divide the sum then by 20, and it will be reduced by the canal, to $75,000, saving the west from an annual taxation of $1,425,000. For the cost of transportation was, he said, paid by the *consumer* of the goods, in the same way that he paid the *duty* that enriched the public treasury. But Pittsburg was not the only place of deposite." Mr. S here read from a letter, which he had lately received from a respectable merchant in Wheeling, who stated, that "he received on on average, three millions of dollars worth of goods per annum, at his store, transported on the Cumberland road, for the carriage of which, he paid about $120,000; by the canal, this sum would be reduced (according to the principle of the report, to which he referred) to $6,000. But an equal saving would be effected on the transportation of the agricultural, and other products of the interior, to the eastern markets. He would mention, he said, a single fact, which might illustrate the importance of this object; from the returns of the Marshals in 1810, it appeared that there had been manufactured in the western counties of Pennsylvania alone, in that year, 417,181 barrels of flour and whiskey. These articles were now carried principally over the mountains in wagons, at an expense of about $3 per barrel, which, by the canal, would be reduced to 15 cents per barrel. The glass manufactured in his neighborhood, he said, was transported to Baltimore by land, at the expense of near one fourth of the price received; (a higher duty than was paid by the foreign article;) on this canal, instead of one dollar per box, they would pay 5 cents. These were a few instances selected to illustrate the advantage of this work; and the results, he repeated, were inevitable, if the principle laid down in the report was correct; and it was confirmed by universal experience, and by all writers on the subject, with which he had become acquainted."

Let it be remembered, that these were the transportations of 1822, during which, the sales of merchandise for the western states is known to have been smaller, than within any of the three preceding years, or for the subsequent or past year. In the year 1821, the amount paid for transportation upon consignments to a single house in Wheeling, was about $ 120,000; assuming nevertheless the expense of 1822, as the average. it appears that *two millions, nine hundred and twenty-five thousand dollars* have been paid for transportation within *five years.*

The cost of land transportation, being *twenty* times greater than canal transportation, it follows that a canal would have effected a saving of *two millions seven hundred and seventy-eight thousand seven hundred and fifty dollars* of the sum actually paid for transporting merchandise between Baltimore and Wheeling, within the last five years.

Extract of a communication from Judge Ruggles, of Ohio.

[Originally published in the Western Herald]

I have read with great satisfaction, a communication in the National Intelligencer of July 12th, on the subject of the Chesapeake and Ohio Canal, signed by Isaac Briggs. This able and intelligent gentleman, this experienced engineer, deserves the gratitude of his country, for his attempt to carry into execution this great national work. Should his views be realized, and a canal be made from Washington city, by Cumberland, to Pittsburgh, besides the important advantages that would result to the States through which it would pass, I consider it would be highly advantageous and beneficial to the great interests of the Union, by connecting the extreme parts with the centre, and by building up the capital of the United States, in which all ought to feel a common interest. The vast and lucrative trade that would be carried on in this channel of commerce with the western country, provided it was completed, would not be solely beneficial to Washington, but would be equally so to Baltimore, by the cutting of a lateral canal from the valley of the Potomac to that city. I cannot permit myself longer to doubt, but that the rich and enterprising citizens of Maryland, so great a portion of whom are directly interested in the execution of this work, and also of Baltimore itself, will see their future interest and prosperity in the accomplishment of this important measure. Should Maryland co-operate with Virginia, and lend her aid and resources to construct a canal from the tide water of the Chesapeake to the Ohio river; she may confidently expect to see the trade of the country lying upon the Ohio, and its tributary streams above the falls at Louisville, flow in this channel to an Atlantic market. Nor would this be the limit of the country that would pour its wealth and trade through the same channel. An extension of the canal from the Ohio river, commencing at some point between Pittsburg and Steubenville, to the southern shores of lake Erie, striking the latter at the most eligible

point between Cleaveland and Harpersfield,* would give to this channel of commerce, if not a monopoly of the four great western lakes, it would at least give to it an equal and fair participation in that trade. If this be a fact, and I shall attempt to demonstrate it, is it not an object of so much value and importance, as to claim the serious consideration of the community? Is it not a prize worthy the most candid attention of the citizens of Washington and Baltimore?

I think Mr. Briggs is mistaken, (with great deference to his opinion, however,) when he says, "*nature*, and the enterprising spirit of her own citizens, have given to New York, *beyond competition*, in addition to her own internal trade, which is very rich, the trade of the St. Lawrence river, that of an immense extent of lake shores, and of the northern parts of the States of Ohio, Indiana, and Illinois, far as the ridge separating the waters that flow into the lakes, from those that flow into the Ohio and Mississippi rivers." I am willing to admit, that the enterprising spirit of the citizens of New York will secure to that State the trade and wealth of those vast regions, unless similar exertions are made in another quarter. But instead of *nature's* having given to New York the trade and commerce of those lakes, I mean Erie, Huron, Michigan, and Superior, I think she has offered it to Virginia and Maryland. The relative positions of those lakes to the Atlantic cities will go far to strengthen this assertion. The cities of Washington, Baltimore, and Alexandria, are at least one hundred miles nearer lake Erie than New York. From Cleaveland to Washington is about three hundred and sixty miles—from Buffaloe to New York, cannot be less than four hundred and sixty miles, by the way of Albany, the course of the canal. This calculation relates simply to lake Erie. What would be the situation of those two canals, if they were constructed with regard to the trade of the three north-western lakes, Huron, Michigan, and Superior? Boats or vessels, bearing the produce of the countries bordering upon those lakes, must all pass through the Detroit river, and by the city of that name. Those boats or vessels, therefore, would made Cleaveland, the supposed termination of the Chesapeake canal, with two hundred miles less sail than they could reach Buffalo, the termination of the New York canal. This, added to one hundred miles, the advantage which Cleaveland has over Buffalo, as before mentioned, gives a difference in distance in favor of Washington and Baltimore, over New York, for the three north-western lakes, of three hundred miles. This difference in distance would be sufficient to counterbalance any additional labor or

* I will designate more particularly the route which I suppose would be the most eligible. From Washington along the valley of the Potomac to Cumberland: from thence, across the mountains, by the aid of the waters of Savage creek and Deep creek to the Youghiogany; thence, down the same to the Monongahela, following the latter stream to Pittsburg. From this place along the margin of the Ohio river, to the mouth of the Big Beaver; thence, up the same, till the waters of the Mahoning fall into it; thence along the Mahoning, across the dividing ground, to the waters of Grand river; thence, down or near the same, to its mouth at Painsville, on the lake. Whoever casts his eye upon the map, will perceive that the course of these streams is in almost a direct line from Washington to the lake.

expense that might be incurred in making and navigating the canal across the mountains. Add to to this the fact, that the Chesapeake canal would be open for navigation earlier in the spring, and later in the fall, in consequence of its more southern latitude—and I think it would not be unreasonable to conclude, that Mr. Briggs was mistaken, when he said that *nature* had given to New York, *beyond competition*, the trade of those lakes, and of the northern parts of the States of Ohio, Indiana, and Illinois. My opinion is, that *nature* has offered to the inhabitants of the Chesapeake an equal, if not an advantageous participation in that trade.

[After some remarks relative to the practicability of the project, the writer adds:]

From the foregoing remarks and extracts, it will appear, that the obstacles which have hitherto been considered insuperable, to a canal navigation across the mountains, have been entirely removed. I trust there is spirit, enterprize, and capital, sufficient, in that portion of the country, which will be benefitted by it, to commence and complete the work.

The next question that presents itself is—The policy of continuing this canal from the Ohio river to the lakes, as one regular connected channel of commerce. During the present summer, Judge Tappan, chairman of the Ohio Canal Commissioners, a gentleman of science and considerable experience, has explored the route heretofore mentioned in this communication, and found that no difficulties oppose themselves to the execution of such a work. The country is level, and the water abundant. The public may expect an interesting report from this gentleman, at the next session of the Ohio legislature, on this subject. The distance between the Ohio river and lake Erie, at the nearest point of approximation in this direction, does not exceed 90 miles.* It is therefore evident, that a canal can be made with great ease, and at a moderate expense. I have before examined the relative position and distance of New York, Baltimore, and Washington, from the four north-western lakes, by which a difference of distance was found in favor of the two latter cities, of three hundred miles, sufficient, in my estimation, to turn a great portion of the trade, if not all of it, in that direction. This question early occupied the mind of the great Washington, and from his publications concerning it, it appears that he confidently anticipated that the period would arrive, when the commerce of the lakes would take this course to the ocean. His manuscript calculations make a difference between the route from Detroit to Alexandria, and that to New York, of 496 miles.

The great advantages and benefits resulting from the accomplishment of such a work, must be obvious to every one. It would furnish an outlet to the rich agricultural productions of the west. Every article reared by the labor of the farmer, would receive an additional

* The expense of making the canal from the Ohio to the lakes, has been estimated by a gentleman of considerable experience, at 700,000 dollars.

value of 40 or 50 per cent. The produce of the rich and extensive mines of lead and copper on the borders of the northern lakes, so necessary in ship building, and in carrying on the operations of war, would float in the same direction, and find a market in the centre of the union. The furs and peltries taken on the great lakes and the upper Mississippi, would find their nearest Atlantic market on this route—while the productions of foreign commerce, wafted to our shores from all parts of the world, would in return, with great facility, cheapness, and expedition, be distributed through this vast interior.

I have presented this subject to my countrymen, with a hope that it will receive a candid and dispassionate discussion. It is my intention, in a future number, to make an estimate of the whole distance of the canal, and a calculation of the expense of making it, together with the price of freight per hundred, from the lakes, and from the Ohio river to Washington and Baltimore.

AN OHIO FARMER.

The following letter as containing some highly interesting suggestions, relative to the proposed canals, regarding them in a military point of view, cannot fail to be read with a great degree of interest. The source from which they have emanated, entitle them to the highest consideration and respect.

Letter from General Thomas S. Jesup, Quarter Master General U. S. Army.

WASHINGTON CITY, *January* 16*th*, 1824.

SIR: Your letter requesting my views in relation to the military importance of the proposed western canal, was received some time ago; but in consequence of the weak and diseased state of my eyes, and the attention, which my official duties required of me at the close of the year, I have been prevented from replying to it at an earlier date.

How important, soever, internal improvements, such as roads, canals, and bridges, may be in a political and commercial point of view, I am persuaded they will be found to be still more so in their relation to the military defence of the country; for the military power of a nation consists not so much in a numerous population and great resources, as in the capacity which it possesses of concentrating them at assailable points, with certainty and rapidity. If this proposition be true, and I hold it to be undeniable, it inevitably follows that the nation having the best system of internal improvements, all other circumstances being equal, will be more powerful than any other, particularly in wars of defence, because it can place at any point on the frontier

a greater force, and a larger portion of supplies, in a given time, than its antagonist.

The military power of contiguous nations of equal force, is in proportion to the rapidity with which that force may be concentrated—for instance, if one move its troops to the point of action, at the rate of forty miles a day, and the other at twenty, it is evident, that the former may on all occasions operate with a force double to that of the enemy—and the whole secret of success in war, as well as in politics, consists in being able to oppose the many to the few.

If nations thus situated be able to concentrate equal forces in the same time, that which can accomplish the movement with the least fatigue to its troops, will beat the other, for its force will arrive on the ground better prepared for action, and may gain the victory before its enemy be sufficiently refreshed to make a vigorous defence.

From experiments made by this department on the New York canal, it has been ascertained that troops may be moved without fatigue, and with all their supplies, at the rate of fifty or sixty miles in twenty-four hours. Now, the experience of service proves, that the greatest average march of a column by land on the best roads, will not exceed twenty miles a day—and if a movement be continued at that rate for four or five days, the troops employed would require a considerable time for repose, before they would be fit for efficient service in the field. It consequently follows, that canals, as a means of military concentration, are preferable to even the best turnpike roads; for *they* enable a nation possessing them to concentrate its force with more certainty, rapidity, and with less fatigue, than could be done by any other means whatsoever.

If, for instance, this city were menaced with an attack, as during the last war, the government, unless it should have an army permanently stationed here, for defence, would compelled to rely on the militia within twenty or thirty miles of the city. And even, if that force were brought together, it would be almost impossible to supply them with provisions, and other necessaries by land transportation. But, if the proposed canal were completed, the whole force and means of the country from this city to the Ohio river would be available, and and could be brought to the point of action with less fatigue to the troops, than would be produced by one day's march. And those assembled, certain of reinforcements and supplies, would feel more confidence in themselves, and consequently be better soldiers.

If the canal were continued to Baltimore, Philadelphia, and New York, the whole disposable force and supplies of the immense region depending upon those cities, might be used in the defence of any point from Norfolk to New York.

Should this scrawl afford you a single useful hint on the subject, so interesting to us all, I shall feel much gratified.

Wishing success to your patriotic exertions,

I have the honor to be, with great respect,

Sir, yours, &c.

TH. S. JESUP.

MR. SHRIVER.

Prices of Canal Stocks in London, Octobec, 1822, taken from the European Magazine for October, 1822; to which is added the length of each Canal, &c.

CANALS.	Share.	Selling price.	Annual div.	Length.	Fall.
	£	£	£	miles	feet.
Barnsley, - - - - - - -	160	200	10	15	120
Birmingham, - - - - - -	25	580	24	(a branch.)	
Chesterfield, - - - - - -	100	120	8	46	380
Coventry, - - - - - - -	100	1070	44 3	33	
Cromford, - - - - - - -	100	270	14	18	
Derby, - - - - - - - -	100	140	6	9	
Erewash, - - - - - - -	100	1000	58	12	108
Forth and Clyde, - - - -	100	470	20	35	
Grand Junction, - - - -	100	245	10	94	587
Leeds and Liverpool, - - -	100	365	12	130	840
Leicester, - - - - - - -	100	300	14	14	
Loughborough, - - - -	100	3500	170	9	
Melton Mowbray, - - -	100	222	11	—	
Monmouthshire, - - - -	100	170	8	18	
Neath, - - - - - - - -	100	410	25	4	
Nottingham, - - - - - -	150	200	12	15	
Oxford, - - - - - - - -	100	730	32	91	
Shrewsbury, - - - - - -	125	170	9 10	18	
Somerset coal, - - - -	50	170 10	7	18	
Stafford and Woostershire, -	140	700	40	47	294
Stourbridge, - - - - - -	145	200	9	—	
Stroudwater, - - - - - -	145	495	22	8	108
Swansea, - - - - - - -	100	185	10	18	
Trent and Mersey, - - -	100	1710	75	93	594
Warwick and Birmingham, -	150	230	11	25	
Warwick and Napton. - -	100	210	10	15	

A Table of the Principal Canals of England; with their length in miles, and rise, and fall in feet, &c. from the maps of Smith, and Philips's work on Inland Navigation.

NAMES OF THE CANALS.	L'gth. miles.	Rise, feet.	Fall, feet.	Cost £ Sterling.	No. of tun'ls	Length of tunnel, mls. yds.
Aberdare,	7½	40	•	33,500		
Aberdeen,	19	170	•	50,000		
Andover,	22½	•	177			
Ashby de la Zouch,	30¼	140	84	200,000		
Ashton,	7	152				
Barnsley,	14½	•	120	97,000		
Basingstoke,	37	195	•	186,000		
Birmingham and Fazely,	16½	•	228			
Brecknock,	33	68	•	150,000	1	220
Caledonian,	60½	90	94			
Chester,	17½	•	171			
Chesterfield,	40	45	335	100,000		
Coventry,	27	•	87			
Crinian,	9	58	59	180,000		
Cromford,	14½	80	•	•	1	1 1240
Croyden,	9	150	•	80,000		
Dearn and Dove,	9½	125	•	100,000		
Derby,	17	29	•	90,000		
Dudley,	10½	•	85	130,000	2	2 340
Duke of Bridgewater,	35	•	84	•	1	4
Ellesmere,	57	228	380	400,000	2	1262
Erewash,	12	181				
Forth and Clyde,	35	155	156	300,000		
Grand Junction,						
Brentford and Braunston,	93¾	567	229			
Paddington,*	101¼	437	229	1,125,000	3	2 1200
Grand Union,	23¾	54	76			
Grand Trunk,	93	316	326			
Grantham,	30	148	•	129,000		
Hereford and Gloucester,	36½	195½	30	30,000	1	1 432
Huddersfield,	19½	335	436	276,000	1	3 1540
Kennet and Avon,	57	211	402	710,000	1	2 888
Kingston and Leominster,	45½	496	48			
Lancaster,	76	422	•	614,100		
Leeds and Liverpool,	117	431	410	540,000	1	1633
Leicester,	21½	•	45	84,000		
Loughborough,	9½	•	41			
Manchester to Bolton and Bury,	15	187	•	67,000		
Manchester and Oldham,	11	152	•	170,000		

* Same Canal.

NAMES OF THE CANALS.	Length miles.	Rise, feet	Fall, feet.	Cost, £ Sterling.	No. of tun'ls.	Length of tunnel mls. yds.
Monmouthshire,						
Newport, - - - - - -	11	447				
Ebroy, - - - - - - -	12	358	•	319,385		
North Wilts, - - - - -	8½	•	59			
Oakham, - - - - - - -	15½	126	•	106,000		
Oxford, - - - - - - -	91½	195	74			
Rochdale, - - - - - - -	31½	338½	275	391,000	1	1 1320
Sankey, - - - - - - -	12½	78				
Severn, - - - - - - -	178	225				
Shrewsbury, - - - - - -	17½	155	•	70,000		
Shropshire, - - - - - -	7½	332	120			
Somerset,						
Dunkerton, - - - - -	8	138				
Rodstock, - - - - - -	7½	138				
Stafford and Worcester, -	46½	294	100			
Stratford on Avon, - - -	23½	•	209	225,000		
Stroud, - - - - - - -	8	•	102			
Swansea, - - - - - - -	17½	336	•	60,000		
Thames and Severn, - -	28¾	129	241	225,000	1	2 880
Trent, - - - - - - - -	100	•	86½			
Union, - - - - - - -	22½	•	175	300,000	4	1 1160
Wilts and Berks, - - -	52	165	211	311,900		
Worcester and Birmingham,	29	•	428	399,929	1	1 880
Wysely and Essington, -	24	270				
Branches, - - - - - -	10	276				

19th CONGRESS, 1st SESSION. [Rep. No. 216.] Ho. of Reps.

CHESAPEAKE AND OHIO CANAL—EXTENSION OF

MAY 16, 1826.

Read and laid upon the table.

MR. STEWART, from the Committee on Roads and Canals, to which the subject had been referred, made the following

REPORT:

The Committee on Roads and Canals, to whom was referred a resolution instructing them to inquire into the expediency of Surveying a route for the extension of the Chesapeake and Ohio Canal, from Pittsburgh to Lake Erie, by way of the Allegany river, &c. &c. and two reports of the U. S. Engineers in relation to a Canal to connect the Juniata with the Potomac river, and to a feeder from the summit level on Deep Creek to that of Casselman river, respectfully report:

That the connexion of the waters of the Ohio river with those of Lake Erie, is considered as an object of great national importance, especially when viewed as a continuation of the Chesapeake and Ohio Canal. Without extending the improvements so as to open a communication with those great inland seas, this great work would seem to be incomplete, and to have less of a national character. We will, in pursuance of these considerations, direct our views from thence to some point on Lake Erie, with which the connexion may be formed. With this view, one of the first considerations which presents itself to our minds, is the advantage of selecting a point where a safe and convenient harbor may be afforded. In this respect, as well as in point of distance, (it being as near a point from Pittsburgh as any other on the Lake, or nearly so,) the harbor of Presque Isle presents advantages which cannot be overlooked.

This capacious and beautiful harbor presents great natural advantages. The only deficiency which it ever presented, was a difficulty of entrance, by reason of some obstructions at its mouth, and it is now ascertained, that the improvements in operation, under the auspices of the National Government, as well as that of the State of Pennsylvania, are attended with the most favorable results, and will, no doubt, eventuate in the entire removal of the obstructions.

These considerations indicate the propriety of a survey of the country, and of the intervening waters, with a view to a connexion between the Ohio river at Pittsburgh, and that point on Lake Erie. There are two routes by which this connexion might be effected. The one is from Pittsburgh to the mouth of Beaver Creek; thence, up said Creek, by the way of Shenango Creek to Conneaut Lake, and from thence to the harbor of Presque Isle. This route is supposed to possess many advantages, and has already attracted the attention of the Government.

The other route is by way of the Allegany river and French Creek. Without expressing any opinion as to a preference, but leaving that point to be decided by professional and disinterested men, they believe that both routes are of sufficient importance to entitle them to examination and survey. During the last season, a survey of the route by way of Beaver Creek, Shenango, and Conneaut Lake, was partly effected, and we understand will be completed in the ensuing summer. This survey, so far as it is made, is in a direct line from Conneaut Lake to Lake Erie, terminating at the mouth of Elk Creek.

The Committee would recommend a survey from this line to the harbor of Presque Isle, either by diverging from the line now surveyed from Conneaut Lake to Lake Erie, or by a survey from the mouth of Elk Creek to the harbor of Presque Isle, as, upon examination, might be found most practicable. This would add but little to the length of the line of Canal, and would lead to a termination at a good harbor, which they consider of great importance.

With the same view of promoting this grand connexion, as well as with various other views of internal improvement, your Committee would earnestly recommend the survey of the Allegany river, and its tributary streams. This fine river they consider as of particular importance, and that it may be the means of promoting the most important views of internal improvement. They are of opinion that this stream affords sufficient water for a steam boat navigation from Pittsburgh to the town of Warren, in Pennsylvania At the town of Franklin, (a distance of about seventy miles from Pittsburgh, by land, but which distance is greatly increased by the sinuosities of the river,) it receives French Creek, a stream navigable to the town of Waterford, situate but fourteen miles from Lake Erie, admirably adapted to the purposes of internal improvement, and of itself more than sufficient for the supply of a canal of the largest dimensions.

The Committee would further recommend a survey of the Allegany river from Pittsburgh to the mouth of French Creek, from thence up said creek, to the outlet of Conneaut Lake, and the town of Meadville, and from thence to the harbor of Presque Isle, by such route as, upon due examination, shall be found to be most practicable and advantageous.

In relation to the contemplated line of canal from the Juniata to the Potomac river, and the feeder from the Deep creek summit to that of Casselman river, the committee have examined with care the reports of the Engineers who recently made some examination relative

to these subjects. The examinations of the proposed canal route between the Juniatta and Potomac was chiefly superficial, and confined to the valleys of Evitt's creek and Wills's creek. The report of the Engineer exhibits the facilities which are presented for this communication in a favorable point of view. The committee deem it unnecessary to advance any thing as to the importance which this project possesses. Its advantages were adverted to in the joint communication of the committee and the delegation from Pennsylvania, and were sufficiently striking to have procured the examination already made. They have examined the Report of the Engineer, with a particular view to ascertain whether it justifies the recommendation of further and accurate surveys. On this score they are fully satisfied. The valley of Wills's creek seems to offer an uncommonly favorable opportunity of locating a canal, and the difficulty to be overcome at the ridge dividing the streams of the Juniatta and the Potomac is by no means formidable. The Engineer who made the examination seems to have been impressed with the favorable appearances, and gives it as his opinion "that the subject is deserving of further and more particular investigation." In this opinion the committee fully concur, and would recommend, as soon as it can be done, such operations of survey, and gauging of streams, as seemed to be looked to by the Engineer who made the reconnoissance, or as may be deemed most suitable by the Engineer department to accomplish, or decide upon the practicability of the scheme.

The scheme of transferring the waters of the proposed summit level at Deep creek to that of Casselman river, was examined with some particularity. Such surveys were executed as to have rendered it certain that the plan is a practicable one. The importance of this auxiliary, both as it respects the immediate canal to which it relates and the proposed cross communication to the Juniatta, cannot but be seen and properly appreciated. The committee are aware that the season when the surveys were made was highly unfavorable for field operations, as they are that the time for executing them was limited. They cannot pretend to say whether what has been done is sufficient for the purposes of the Board in making their final estimates on the subject, but would rather infer that more minute surveys than those adverted to, would be necessary. They conceive this project, peculiarly connected as it is with the grand scheme of canal communication between the Atlantic and Western waters, as meriting, in a very especial manner, the attention of the Engineer department, and recommend, in the strongest terms, that any further surveys which may be considered necessary, either to determine the general route of the feeder, or to ascertain the shortest lines for the proposed tunnels, should be accomplished during the ensuing season, in order that the Board may have it in their power to present the subject in the clearest possible manner for the investigation and determination of the next Congress, before whom, it is presumed, it will, at the next session, be fairly brought for an ultimate decision.

19th Congress,
2d Session.

[Doc. No. 85.]

Ho. of Reps.

AN ACT

TO

AMEND THE ACT OF INCORPORATION

OF THE

CHESAPEAKE AND OHIO CANAL COMPANY.

February 8, 1827.

Referred to the Committee of the Whole House to which is committed the "Bill authorizing a subscription to the stock of the Chesapeake and Ohio Canal Company."

WASHINGTON:

PRINTED BY GALES & SEATON.

1827.

AN ACT

To amend the "Act Incorporating the Chesapeake and Ohio Canal Company."

SEC. 1. *Be it enacted by the General Assembly of Maryland,* That the act, entitled "An act incorporating the Chesapeake and Ohio Canal Company, passed by the General Assembly of Virginia, at the December session, eighteen hundred and twenty-three," which has already received the assent of the State of Maryland, and of the Congress of the United States, as well as of the Potomac Company, shall be, and the same is hereby, amended, in the manner hereinafter provided, on condition that this act receive, in like manner, the assent of the necessary parties thereto.

SEC. 2. *And be it further enacted,* That the Chesapeake and Ohio Canal Company shall have power to terminate the Eastern Section of the said Canal, at or near the town of Cumberland, on the river Potomac, and thence, to extend the Western Section thereof, in any direction that may be deemed expedient, by any other route, as well as that prescribed in the act aforesaid, towards Pittsburg, on the river Ohio; and, in extending the same in any direction across the dividing ridge which separates the Eastern and Western waters, to substitute for a tunnel, and numerous locks, on such part of the route, inclined planes and railways, or any other artificial communication or roads; and, in the event that the Western Section of the Chesapeake and Ohio Canal shall leave the valley of the Potomac river at any point below the Coal Banks, at or near the mouth of Savage, on the North branch thereof, the Company shall have the power in like manner, to extend a branch from the main Canal, to the said Coal Banks, at or above the mouth of Savage, and to cause such branch to be constructed, of such dimensions as their views of their own and the public interest may warrant; and, for the construction of the same, shall have and enjoy the same rights, privileges, and immunities, under the same restraints and conditions, in all respects, as they are entitled to in relation to the main Chesapeake and Ohio Canal.

SEC. 3. *And be it further enacted,* That nothing in this act contained shall be held to discharge the said Company from a compliance with each and every of the conditions of the original act, except so far as the same are expressly altered by the provisions of this act.

SEC. 4. *And be it further enacted,* That this act shall commence and be in force as soon as it shall have received the assent of the Legislature of Virginia, of the Congress of the United States, and of the Potomac Company.

We certify the aforegoing is a true copy of the original act, passed the Legislature of Maryland, at their present session.

Witness our respective signatures, this sixth day of February, in the year of our Lord one thousand eight hundred and twenty-seven.

W. KILTY, *Clerk Senate.*

GIDEON PEARCE,
Clerk House of Delegates of Md.

19th Congress, 2d Session. [Rep. No. 90.] Ho. of Reps.

CHESAPEAKE AND OHIO CANAL.

January 30, 1827.

Mr. Mercer, from the Committee on Roads and Canals, to which was referred the memorial of the Chesapeake and Ohio Canal Convention, made the following

REPORT:

The Committee on Roads and Canals, to whom were referred the memorial and report of the proceedings of the Chesapeake and Ohio Canal Convention, together with the Report of the United States' Board of Engineers, in relation to the route, plan, and estimated cost, of that Canal, report:

That the memorialists apply to Congress for a sanction to certain alterations of the charter, and for a subscription, on the part of the Government of the United States, to the stock of the Chesapeake and Ohio Canal Company.

The memorial, therefore, required of the committee an examination of the charter of the Company, of the route and dimensions proposed for the Chesapeake and Ohio canal, and of the estimates of its probable cost and future profits.

The charter originated in an act of the General Assembly of Virginia, entitled "An act incorporating the Potomac Canal Company," which passed the 22d day of February, 1823: but which, by its own terms, was made to depend, for its validity, on the assent of the State of Maryland, and of a company incorporated, in 1784, at the instance of General George Washington, by the concurrent acts of Maryland and Virginia, to render navigable, the same river.

Subject to those conditions, this act gave authority to a joint stock company, "to construct a canal from the highest point practicable, on "the North branch of the Potomac, by Cumberland, to tide water in "the District of Columbia." The act omitted to call on the Congress of the United States, the exclusive Legislature of the District of Columbia, within which the canal was to extend and terminate, for an assent to its provisions; and not receiving the sanction of the Legislature of Maryland, a convention of delegates from certain counties and corporations of the States of Virginia, Ohio, Pennsylvania, and Maryland, and from the District of Columbia, assembled in the city of Washington, on the 8th day of November, 1823, by invitation from a public meeting in Virginia, and by sundry memorials presented in their behalf, to the Legislatures of those several States, and to the Congress of the United States, sought an extension of the purpose of the prior act of Virginia, so as to embrace a connection, by one con-

tinued canal, of the tide water of the Potomac, with the steamboat navigation of the Ohio, and the Southern shore of Lake Erie. (See App. No. 1.)

The Ohio company had, as early as the year 1763, laid out the plan of the town of Charlottesburg, adjacent to Fort Cumberland, for the purpose of facilitating a commerce with the Indians, by the navigation of the Potomac: their boats had ascended the Potomac from the head of the Great Falls, as early as 1749; and in February, 1773, the facilities afforded by this navigation, for a commerce with the river Monongahela, one of the branches of the Ohio, were publicly advertised by John Ballendine, of Virginia, in the city of London, in reference to a proposal then under consideration, by the British Government, to establish a "new colony on the Ohio, in North America."

By the company incorporated in 1784, large sums had been expended, exceeding in amount 700,000 dollars, in obviating the obstructions to this navigation, by locks, at the principal falls of the Potomac, and the Shenandoah, its longest branch, and in fruitless efforts so to improve the beds of both rivers, and of other tributaries of the former, as to furnish a safe and easy navigation. (See App. No. 2.)

Those efforts have left the ascent of the Potomac, by a loaded boat, nearly, or quite as costly, as the transportation of the same burthen by land, upon the adjacent roads.

The possibility of substituting a continued canal from the tide, to Cumberland, or to the mouth of Savage river, at the Eastern base of the Alleghany, at the ordinary cost of similar improvements along the margin of other rivers alike circumstanced, had not been doubted; nor could it be, when it was considered, that, with no peculiar obstructions to such a work, the Potomac, between the mouth of Savage and the cities upon its tide, was already navigated: that its whole descent, on a line of 212 miles, was but 890 feet, and from Cumberland, or for 182 miles of that distance, but 578 feet.

That a connection might be effected between the waters of the Potomac and Ohio, by a navigable canal, had been suggested to the Board of Public Works of Virginia, very early after its formation, in 1816. Its practicability was ascertained in 1820, by an actual survey, conducted by the principal Engineer, by order of that board. The result of this survey was made the basis of a report, by a committee, to the House of Representatives, on the 3d of May, 1822; was subsequently confirmed, first, by an examination and survey, superintended by commissioners, under the joint authority of the States of Virginia and Maryland, in the ensuing Summer and Autumn; and, last of all, by repeated examinations and surveys of the United States' Board of Engineers, acting under the authority of Congress, by order of the President. These surveys, begun in the year 1824, have been diligently and patiently prosecuted, until their termination, by a report embracing the estimate of that Board, accompanying the President's message to both Houses of Congress of the 7th December, 1826. (See App. No. 3.)

The memorial of the Washington Convention to the General As-

sembly of Virginia, gave rise to "An act incorporating the Chesapeake and Ohio Canal Company," which passed that body on the 27th of January, 1824. (See App. No. 4.)

To this act, the General Assembly of Maryland gave their conditional assent, by an act of the 31st of January, 1825, entitled "An act to confirm an act of the General Assembly of the State of Virginia, entitled 'An act incorporating the Chesapeake and Ohio Canal Company." (App. No. 5.)

An act of the Congress of the United States, approved the 3d of March, 1825, complied with the condition expressed in the act of Maryland, and at the same time confirmed the charter, the joint act of both Maryland and Virginia, by authorizing the extension of the canal to any point within the District of Columbia. (App. No. 6.)

The acquiescence of the Potomac Company in the new charter, was expressed, pursuant thereto, by the unanimous resolutions of the Stockholders, in general meeting, on the 16th day of May, 1825, and, in the ensuing Summer, commissioners were appointed by the President of the United States, and the Governors of Virginia and Maryland, to open books of subscription to the stock of the Chesapeake and Ohio Canal Company. (App. No. 7.)

The charter left so much of the original design of the Convention as contemplated an union of the Ohio, at Pittsburg, with Lake Erie, to be accomplished by the united efforts of the States of Ohio and Pennsylvania. So far as its more limited purpose was completed, it authorized an extension of the Chesapeake and Ohio Canal to the Pennsylvania line, in a prescribed route. This route, the charter divided into two sections, denominated Eastern and Western. The first was required to terminate on the North Branch of the Potomac, at the mouth of Savage Creek, which unites with that river at the Eastern base of the Alleghany Mountain, thirty miles above the town of Cumberland, in the State of Maryland, amidst the richest beds of coal hitherto discovered on the Atlantic waters of the United States.

The second, or Western section, embracing that portion of the canal which the United States' Board of Internal Improvement have denominated, under a distribution of their own, "the Western and Middle sections," is required to commence at the termination of the first, or Eastern section, and to "extend along the valley of Savage Creek so far up the same, or any branch thereof, as to enable the canal to reach some convenient point thereon, for connecting the Eastern and Western waters by a tunnel through, or an open cut across, the dividing ridge, between the same; and thence, to proceed to the highest steamboat navigation of the Ohio river, or some one tributary stream thereof, in such direction as shall be best calculated, in the opinion of the President and Directors of the Company, to establish a connected navigation between the Eastern and Western waters."

The assent of Pennsylvania to the new charter was conditionally accorded by an act, entitled "An act incorporating the Chesapeake and Ohio Canal Company," which passed during the last session of

her General Assembly. Among the conditions of this confirmatory act, the third section requires that the proposed canal "*shall be extended to and terminate at Pittsburg;*" and the fourth section authorizes the Chesapeake and Ohio Canal Company, "to change the route of the Western section of the canal, so that it may commence at the town of Cumberland, on the North Branch of the Potomac, and be continued from thence, by the valley of Will's Creek and Casselman's river, to the Youghiogeny; and from thence to Pittsburg; provided that the United States' Board of Internal Improvement, or or a majority of them, should deem and report that route to be the best. (App. Nos. 8, & 14.)

The expediency of granting the power provided by this section, was suggested by the discovery that the route by Will's Creek and Casselman's river, across the Alleghany, with a summit level of less elevation by 436½ feet, an abundant supply of water, and a shorter line by at least 18 miles, could be conducted, by means of a prolonged tunnel, over better ground, with greater security from future accidents, than the more Southern route before contemplated, between Cumberland, by way of Savage Creek, and a point on Youghiogeny river, common to both routes.

To the Northern route, therefore, the United States' Board of Internal Improvement, by whom these facts had been ascertained, have given the preference required by the Pennsylvania act just recited; and to procure for the Chesapeake and Ohio Canal Company the power, if they shall hereafter deem its exercise expedient, to adopt this route, is one of the objects of the memorialists.

But, as its adoption might be supposed to supersede the authority, as well as the necessity of constructing a canal higher up the Potomac, than Cumberland, in the valley of Will's creek, the memorialists, for the sake of reaching the coal banks at the base of the Alleghany, seek to preserve the power, in the event that the more Northern route, from Cumberland, across the Alleghany, shall be preferred, to extend a canal of suitable dimensions, to the coal banks at the base of that mountain.

To obviate any possible embarrassment from a doubt of the expediency, there remaining none whatever of the practicability of crossing the Alleghany, by a continued canal, in either of the proposed routes, the memorialists further ask, that the company be empowered, if they shall deem it more advisable, to substitute, in certain parts of their intended line of navigation, embracing the tunnel and very great lockage, inclined planes and railways, or an artificial road, for a continued canal.

The committee have felt no hesitation in according to the memorialists all the amendments which they have solicited, and for this purpose report a separate bill.

As it is important to the object of the memorialists, that these amendments shall not be delayed, the committee have, by the terms of this bill, anticipated the legislation of the several States who are parties to the charter, by giving the assent of the United States,

should the bill meet with the sanction of Congress, to any future alteration of the route of the canal in its progress West of Cumberland; deeming it perfectly safe to confide to the company, under the control of the States who are parties to their charter, the power to adjust the course of the canal to such views of expediency, as the information already acquired, and that which time may supply, shall, in their judgment, hereafter recommend.

By the same bill, the committee, conformably to the wishes of the memorialists, have supplied an explanation of that clause of the act of Congress, of the 3d of March, 1825, which, in confirming the act of the State of Maryland, that sanctioned the prior act of Virginia chartering the Chesapeake and Ohio Canal Company, authorized the extension, by that State, of a branch from the main canal through the District of Columbia. Serious doubts have been entertained, in that Commonwealth, whether, by the terms of that clause, an adequate security has been provided for the practical enjoyment of the important privilege designed to be conferred by it. The explanation recommended to the House, by the committee, pursues the intention of the former act of Congress, and will obviate any possible doubt of its just legal construction.

In another bill, accompanying this report, the committee have sought, by one of the conditions of the subscription, which they recommend to the stock of the company, to accommodate the interests of the United States, as well as of the States of Maryland and Virginia, in any future extension of a branch from a point of the main canal, within or through the District of Columbia, to the Navy Yard, or to the market towns of either of those States. The subdivision of the canal, next above Georgetown, descending from the head of the Little Falls of the Potomac, according to the recommendation of the United States' Board of Engineers, referred to in the bill, follows the valley of the Potomac to the termination of the main stem of the canal, with an elevation of thirty-seven feet above the tide, until it reaches Georgetown: so as to admit a branch therefrom, by an aqueduct bridge across the Potomac, raised above any possible injury from the river freshets, and to favor the distribution of its water, for commercial and naval purposes, through Georgetown and Washington, as well as its easy extension to Alexandria, and the cities of Maryland. For the same reason, the last mentioned bill requires, that the last resort, to the river Potomac, for a supply of water, shall be, by a canal designed to serve, also, as a feeder, not less in width, throughout, than sixty feet at the water line.

The Committee now come to the last object of the memorialists, which is to procure from the Government of the United States, a subscription to the stock of the Chesapeake and Ohio Canal Company, of such amount, and on such conditions, as they deem essential to the commencement, and calculated to assure the speedy accomplishment of their enterprise.

The memorialists ask a subscription to the Stock of the Canal, to the indefinite extent of a moiety of the sum which may be found ne-

cessary to its completion, or of a specific sum, supposed to be a moiety of that required for its extension from Georgetown to the mouth of Savage, or to the extensive coal banks at the base of the Alleghany.

The Committee have preferred the last form, and have accordingly recommended a subscription of twenty-five thousand shares of stock, to be paid for in not less than five annual instalments; so as to limit the annual payment by the United States to half a million of dollars, and the total sum subscribed to two and a half millions; and they have deferred any farther subscription on the part of the Government, till the Eastern section of the proposed canal be completed.

Superadded to the conditions already noticed, the bill which the committee have framed, requires, in order to give validity to any subscription whatever by the United States, that a sum, not less in amount than the above, shall be subscribed by other stockholders, whose good faith it secures by a practicable and adequate guarantee.

As one of the motives of the subscription provided by the bill, is to give to this great work, dimensions adapted to future and permanent national use, among the prescribed conditions of that subscription, the committee avail themselves of the scientific research of the United States' Engineers, to provide not only for an adherence to the transverse section recommended for the entire canal, by their report; but, to include a farther provision, for so enlarging the canal, as to reduce, wherever it is possible, without great additional expense, the resistance of the boat, for which the locks of the canal are calculated, to that, which such boat would have to encounter in the navigation of an indefinite expanse of water. (App. Nos. 9, & 14.)

The difference of the resistance which this boat would meet, on a canal, having a breadth of forty feet only at the surface, twenty-eight feet at the bottom, with a depth of four feet, compared with that which the same boat would have to overcome, on a canal, of the breadth and depth of that recommended by the United States' Engineers, demonstrates, irresistibly, the expediency of adopting the last dimensions, where practicable, for the entire canal; and an extension of the same principle warrants the proposed enlargement, where it can be effected, by "ordinary excavation," by which is understood to be meant that of common earth. (See App. No. 9.)

Having required of the Company, as a condition of the United States' subscription, a structure of the Chesapeake and Ohio Canal, which must considerably augment its cost, and which is designed to make it subserve purposes of great and lasting public utility rather than of immediate profit, the Committee felt themselves authorized, if not bound, to couple, with the United States' subscrription, a concession, thus rendered as just as it is expedient, since it might eventually prove indispensable to the prompt success of this great undertaking, that the Government of the United States shall forbear to exact any share of the common profit, upon the stock which it subscribes, until all other subscribers shall have netted a reasonable return, or five per centum per annum, for the sums of money that they may have severally paid on account of their respective subscriptions.

The subscription of stock, in behalf of the United States, in very large proportions to the total amount required for the construction of very short canals, of easy execution, already commenced, or far advanced towards completion, having been already sanctioned by very large majorities of both Houses of Congress, the Committee do not deem it necessary, here, to enlarge upon the power of Congress to authorize any such subscription. That to the stock of the Delaware and Chesapeake Canal amounted to 300,000 dollars. The subscription to the Dismal Swamp Canal, grounded on the condition of its enlargement, and requiring no correspondent aid from other subscribers, exceeded its original capital. That to the Louisville Canal, while in progress, bore a larger proportion to its antecedent stock.

Two of these canals, it may be, moreover remarked, are but expedient substitutes for a navigation before enjoyed along the Atlantic sea-board, circuitous, indeed, but at all times practicable, and safe in peace from any danger but of the sea; and the third, at the Falls of the Ohio, for a navigation open, at high water, to the descent of the largest ships; and impeded, in its worst condition, by a portage of but two miles, along the level bank of a river, through a flourishing town, affording every accommodation to the navigator, in the midst of very short delays. The subscription here invited, and which the Committee recommend, is to a work yet to be begun, but which, if successful, and of that no rational doubt any longer exists, if adequate funds for its execution be supplied, will supersede a navigation not only obstructed, but, at all times, dangerous, and a portage of many miles, over numerous rugged and lofty mountains, separating a population of two millions of souls from the residue of the same people, who are destined to multiply with a rapidity unexampled but among themselves, on both sides of the great barrier to their friendly intercourse, which this canal is designed to surmount.

The Committee did not unanimously concur in recommending this subscription, without duly considering every other mode of accomplishing a work, as essential, in peace, to the permanent Union and commercial prosperity of the Eastern and Western States, as in war, to their common defence and safety.

They were, moreover, aware, that its accomplishment by the direct agency of the Federal Government, without the intervention or co-operation of a joint stock association, has been deemed, by respectable authorities, preferable to the mode devised by the charter of the Chesapeake and Ohio Canal Company. In this preference, however, all the practical difficulties have been overlooked or disregarded, arising from the condition and claims of the existing Potomac Company, under their charter; from the absolute denial of the power of the General Government to construct a canal, by one of the parties to that charter; and from the contrariety of opinion, on this interesting topic, existing in both Houses of Congress, among those, who, admitting the authority of the common government, derive it from very different sources in the Constitution, and disagree in opinion as

to the legitimate mode of its operation. A larger number of those friends of internal improvement, it is believed, will be found to unite in this, than in any other practical application of this much contested Federal power.

The committee also believe, that expediency will recommend the particular mode, of executing this great work, in which the Government of the United States has concurred, by the act of the third of March, 1825, and is now urged to co-operate, by a subscription of stock.

That expediency is fortified, by the long continued experience of that European nation which, above all others, is most distinguished in every branch of political economy, and it is, moreover, sanctioned by the authority and reason of the father of that science, if science it may be termed, the author of the "Wealth of Nations." (App. No. 10.)

All the Canals of Great Britain, with but two exceptions, have sprung from the wealth and efficiency of joint stock companies. (App. No. 11.)

To incorporate private with public wealth, individual interest with public responsibility, in the execution and preservation of a work requiring vigilance to enforce a just economy in its construction, and circumspection to watch over its repairs, is the dictate, alike of reason and experience. But, if it were more expedient for the Government of the United States, to construct and maintain, at its exclusive cost, works of national utility, it cannot be less prudent to husband its resources for such purposes, by eliciting a moiety, at least, of that cost, from those private capitalists, who can be induced, but by the hope of gain, to quicken the diligence and watch over the integrity of the subordinate agents commissioned to disburse the common funds for the common benefit.

The Committee are sustained on the ground of these suggestions, by the consideration, that they have been long fostered by the legislation of one State, at least, of this Union; that they were originally incorporated in its system of internal improvement, with this difference only, that, while the subscriptions of the funds of this State are limited to two-fifths only, or less than a moiety of the stock required for a canal or artificial road, promising great public benefit, it forbears any claim whatever to a share of the common dividend or profit of stock in any such work, till all other subscribers to the same stock, shall have netted *six* per cent. per annum, on their respective pecuniary contributions. (App. No. 12.)

It is the obvious tendency of such a system, both to economize the authorized disbursements of the public revenue, when applied to internal improvement, and to extend the efficiency of a given expenditure, by combining it with that private capital, which could not be otherwise elicited, for the common welfare of the United States.

If, in union with these principles, the public appropriations to canals and roads be renewed, from time to time, by the sale and reinvestment of the proceeds of the subscribed stock, whenever it shall have replaced the interest of the sums paid for it, and have reached a

par value in market, a moderate annuity devoted exclusively to internal improvement, may have its beneficent agency so widely extended over the United States, as to be competent to every reasonable demand for objects of purely national benefit.

By transferring to the agency of an incorporated company, the construction and maintenance of each public work so executed, that extension of the patronage and influence of the Federal Government, which is apprehended from the application of the national revenue to works of internal improvement, will be, also, in a great degree, precluded.

A sum may be laid up, in peace, in an imperishable form, by the completion of works essential to the public prosperity and safety, which the assignable quality of the public stocks invested in their construction would afford to the Government a facility for applying to the first exigencies of future wars.

The internal trade, which, in periods of national danger, or obstructed foreign intercourse, supplants in whole or in part, the usual importations from abroad, will enhance the value of this resource, when most needed to aid the declining revenue of a Government, resting, almost exclusively, upon foreign imports, for the means of defraying all its most necessary operations.

Against the possible objection, that war might be wantonly waged, if, by anticipation, resources were provided to meet its first pressure, without a resort to direct taxation, the countervailing consideration arises, that, during its disastrous continuance, it would turn to its unprofitable and wasteful purposes, the means of extending those internal improvements, which can hope for their accomplishment only from the leisure and abundance of peace. It is in peace, also, that the additional duties received on those multiplied returns from abroad, for the varied exports with which internal navigation supplies external commerce, would afford an immediate pecuniary recompense to the Government, for its liberal aid, in the construction of canals of national importance, leading into the interior.

If the Committee shall seem to have dwelt too long on considerations not peculiarly associated with the particular object of their present inquiry, their apology will be found, they trust, in the important bearing which these considerations must have on the question, whether, in the present stage of the great national work, which they presume thus earnestly to recommend to the favorable regard of the House, it be expedient to extend towards it, the pecuniary aid which the memorialists have invited? The Committee cannot regard the subscription, proposed by the bill which they report, as disproportionate to the relative interests of the Government of the United States, in the construction of the Chesapeake and Ohio canal, on the plan recommended by the Board of Internal Improvement. Nor can they perceive a just reason, why such a conditional subscription should not precede that, which the several States, and the numerous individuals, more particularly interested in the commencement and prosecution of this enterprise, may be expected to supply. As a pro-

prietor, interested in a work to which his subscription is invited; as the exclusive guardian of the District of Columbia; and as the Federal Legislature of twenty-four States, the Congress of the Union may well invite the public co-operation in a work of unrivalled local, as well as national utility.

The committee proceed to inquire, very briefly, into the extent of those interests, which, under these various relations, the United States have involved in the successful issue of this undertaking.

Among the proprietors, who look to its execution for an appreciation of the value of their landed property, the General Government is incomparably the largest. The value of this proprietary interest, is to be computed, in reference, not only to the extensive property of the United States, consisting, originally, of a moiety, and still of a great portion of the city of Washington, in the District of Columbia; but to that vast unappropriated domain beyond the Alleghany, which still looks to emigration, to people and improve it, and from the sale of which, an annual revenue of two millions of dollars is now anticipated. (App. No. 13.)

By greatly cheapening the intercourse between the East and the West, the heavy expenditure which the emigrant now incurs, in a protracted journey over numerous mountains, will be converted into an additional fund for the purchase of public lands, and their value enhanced, by affording to the purchaser, a new facility for reaching, without hazard, both in peace and war, the improved markets of the Atlantic, with the diversified productions of his labor and industry.

In regarding the actual condition of a part of those markets, a second interest is developed, accompanied by a high political obligation: that of the exclusive sovereign of a district of country, narrow indeed, in dimensions, but embracing all the cities of the Potomac, and the district of country to which the proposed canal is to be immediately conducted. If it would be the interest of those cities, had they the pecuniary ability, to construct such a canal, at their exclusive cost, the Government which has confided to it, the power of legislating for their benefit, cannot be insensible of the high obligation to promote that interest, which the acceptance of so solemn a trust necessarily implies. Not only the prosperity, but the future safety, of the people of this District, puts up an urgent claim to the exercise of a sovereign authority entrusted to the Central Government of the United States, not for their benefit alone, but for the permanent advantage, security, and honor of the entire Union. The District of Columbia is not bound to the Union as a State, but as the immediate subject of the Government of all the States. It is, in truth, the property of the whole Union: and whatever advances its prosperity, is of immediate importance to the general welfare of that Union. The exclusive legislation of Congress, over the District of Columbia, combines both Federal and State authority; is a complete sovereignty, one and indivisible. Having such a power over the territory and people of the District, for the benefit of the Union, the Congress are invoked to its beneficent exercise, not only by all those considerations to which a State may appeal, in addressing its local Legislature, but

by all those Federal obligations to the States themselves, which are involved in the exclusive legislation of the General Government, over the seat of its deliberations, and the political centre of its operations.

If the Legislature of a single State might legitimately labor to attract to the bosom of its territory the vast and increasing commerce of the West, so may the Congress of the United States to the District of Columbia, and so they are, therefore, bound to do, if it be practicable. The extent of this obligation, in relation to the construction of that channel which the Chesapeake and Ohio Canal provides for accomplishing this object, is not to be measured, as has been sometimes suggested, by the relative proportion which the length of so much of this canal as will lie within the territory of the District, bears to its whole line, since such a ratio is not an adequate standard of the relative benefits to be derived from its completion, to the various portions of territory through which it must pass. Were this otherwise, the extensive States and remote Territories, on the immediate banks of the Ohio and the Mississippi or intersected by their numerous tributaries, would have their immeasurable interest in the execution of this great work, expressed by the very small proportion which the single point that it proposes to touch at Pittsburg, bears to the whole line of continuous navigation, which the canal will establish, across the Alleghany, between the Atlantic and the numerous riversof the West.

The interest of a great market in that channel of trade, which draws to it the various productions of the industry of a vast empire, is to be measured by the entire profits of that trade; and, if the profits of the commerce of the West, or any considerable share of them, be assumed to be the measure of the interest of the District of Columbia, in the proposed canal, and to promote that interest, be a duty of its exclusive Legislature, the subscription of a moiety of the stock of the canal, is not more than commensurate with the obligations of the Federal Government to the People, confided by the Constitution to its provident care.

Can this obligation be evaded, by limiting the extent of the United States' subscription to this canal, by that portion of the public revenue derived from the People of the District of Columbia?

That they are unrepresented, would furnish a fair ground of implication that they should be untaxed, under a Government owing its existence to the principle, that taxation, without representation, is tyranny. But the People of the District are subject to the same species of taxation with all the citizens of the United States, under a system of revenue which, founded on the consumption of foreign imports, precludes the application of any exact estimate of the amount of their contribution to the common treasury. If greater precision were attainable, the committee are totally at a loss to conceive how it could warrant a conclusion at variance with that at which they have arrived.

In founding a durable work, its remote as well as proximate benefits, are to be regarded, and what scale of measurement can determine the future extent of the population, wealth, and consequent consumption of the District of Columbia, if it shall become. as its great founder confidently anticipated, the emporium of the West?

The end of the delegation to the Federal Government of any power whatever over the District of Columbia, was simple, indivisible, and of universal interest. (*a*) For the promotion of this end, the common Government may rightfully, and must, necessarily, command the common revenue of the Union. Whatever augments the wealth and population of the District, adds to the security of the seat of the Federal Government of all the States. The prosperity of the District and of the Union cannot, therefore, be severed. A neglect to promote, by all practicable and ordinary legal means, the welfare of a People, who have no Government but that of the United States, would not be less dishonorable, than to decline the exercise of an acknowledged Federal power, when manifestly required for the benefit of the American People. The power of Congress over this District vested by the Constitution, is, therefore, accompanied by obligations of high dignity, that can be surrendered, neglected, or abandoned, only by a dereliction of duty, little short of a violation of the letter, as well as of the spirit of the Constitution itself.

The memorialists appeal, moreover, to the relation of the Federal Government to the States, which it unites, in behalf of a work calculated to perpetuate to the American People, and their latest posterity, the blessings of peace, freedom, and independence: Objects, which, in themselves, can have no limit to their value; because, without them, all other advantages, public or private, national or individual, are precarious and fleeting. The expediency of providing for objects of such magnitude can be bounded only by the extent of the public resources. And no provision, among the many internal improvements which solicit the favorable countenance and pecuniary aid of the Federal Government, can surpass, in this tendency, the Chesapeake and Ohio Canal. Extended, as was originally contemplated by the memorialists, and is now found practicable, from the Chesapeake to Erie, by Pittsburg, it unites, by one unbroken line of navigation, the shortest that can be devised, the seat of the Government

(*a*) Act of cession by the State of Virginia distinctly sets forth this end.

"Sect 1. Whereas the equal and common benefits resulting from the administration of the general Government will be best diffused, and its operations become more prompt and certain, by establishing such a situation for the seat of the said government, as will be most central and convenient to the citizens of the United States at large, having regard as well to population, extent of territory, and a free navigation to the Atlantic ocean, through the Chesapeake bay, as to the most direct and ready communication with our fellow-citizens in the western frontier: *And whereas* it appears to this Assembly, that a situation combining all the considerations and advantages before recited, may be had on the banks of the river Potomac, above tide water, in a country rich and fertile in soil, healthy and salubrious in climate, and abounding in all the necessaries and conveniences of life, where in a location of ten miles square, if the wisdom of Congress shall so direct, the States of Pennsylvania, Maryland, and Virginia may participate in such location;

Be it therefore enacted by the General Assembly, That a tract of country, not exceeding ten miles square, or any lesser quantity, to be located within the limits of this State, and in any part thereof, as Congress may by law direct, shall be, and the same is hereby forever ceded, and relinquished to the Congress and Government of the United States, in full and absolute right, and exclusive jurisdiction, as well of soil, as of persons residing or to reside thereon, pursuant to the tenor and effect of the eighth section of the first article of the Constitution of Government of the United States."

with the three great limits of the United States: the Atlantic Ocean, the Gulf of Mexico, and the great Northern Lakes.

No State of this Union; not one of its many markets; no branch of its industry, whether it speed the plough or spread the sail, or ply, at home, the shuttle or the hammer; whether its activity be exerted on land or the sea, to the North or South, the East or West, is without an interest in the accomplishment of this national work.

The Committee deem it unnecessary farther to enlarge upon a topic, which if it claim the exercise of a constitutional authority, more questionable than either of those powers on which this report has hitherto relied to warrant the appropriation that it recommends, rests that claim on the strongest ground that can be presented to the General Government—in behalf of a canal connecting the seat of its deliberations and the source of its political action with the remotest extremes of its wide-spread territory. A work which, in the number of interests which it has sought to harmonize, as well as in the complicated political agency which the charter to construct it required, illustrates, alike, the extent of its utility, and the difficulty of its accomplishment, without the authority and aid of a common government. Having been brought, by great preparatory labor, to its present condition, it awaits, for its future progress, the acquisition of adequate funds to commence its operations. And, for these, it relies, as must every similar undertaking, on the wisdom, enterprize, and resources of all the interests, national and local, public and individual, involved in its successful prosecution.

Should the Government of the United States, however, regard as insufficient, to warrant the aid which the Committee have proposed to the House of Representatives to extend to this work, all those considerations arising from its relation to the national domain, to the prosperity of the District of Columbia, and to the welfare and safety of the Union, still there remains another ground, on which to rest the expediency of the proposed subscription. For, although, according to the terms annexed to it, in the bill reported by the Committee, the profit to be derived from the Canal, by the United States, is made contingent, and dependent on the prior profit, to a limited extent, of all other subscribers to the stock of the Canal, yet the general views which have been presented, and those which a closer investigation will superadd, must induce a confident belief that the public Treasury, should its claim to profit be deferred for a time, will be ultimately reimbursed all that it is invited to advance, with ample interest.

The report of the United States' Engineers, by the application of a simple principle of experimental philosophy to inland navigation, has demonstrated, that, if the execution of the Chesapeake and Ohio Canal be completed, according to the plan which they have recommended, the labor and the time, and, so far, the expense of transporting a given burthen upon its surface, notwithstanding its greater lockage, will be less than is encountered upon the Erie canal of New York, by which it is exceeded in length but a few miles. (See App. No. 14.)

Its tolls, if regard be paid to profit, must depend, indeed, upon its actual cost; but the laborious and patient investigation accompanying

the proceedings of the memorialists, manifests that this work can be constructed at a cost much less than the amount of the estimate of the United States' Engineers, and the Committee have derived from their own body, as well as from other sources, satisfactory assurances, in confirmation of the reduced estimate of the Convention. They are also apprized, that, at the present moment, the expense of every species of industry employed in constructing the New York canals, is so greatly lessened, that, if that work were again to be constructed, with the experience which it has purchased, its cost would probably be reduced one-third in amount. Its actual cost has not, however, fallen far short of the sum, at which, it is believed, the Chesapeake and Ohio canal can be completed, including the expense of an enlarged tunnel. But, had the Erie canal cost the State of New York a much larger sum, there exists not a doubt, that the great State which has, so much to its honor, executed this useful enterprise, would deem its capital profitably invested. (See Appendix, No. 15.)

Extending the comparison, which the United States' Engineers have instituted, between the *expense* of transportation, on both canals, to the *relative use* which will probably be made of them, so as to judge of their *comparative profit*, several important considerations will be found to concur, in favor of the canal which shall immediately connect the tide of the Potomac with the steamboat navigation of the Ohio: and, if the result of this comparison be in favor of the Southern canal, the expediency of a subscription to its stock will not be questioned.

The Committee might comprehend, in this view, very many interesting details; but they will confine their inquiry to the narrowest scope consistent with their object.

The first advantage of the more Southern canal, over that of New York, is derived from its latitude. It will be free from ice a month later in Autumn, and a month earlier in the Spring, in the annual period during which both canals are used. A difference in favor of the Chesapeake and Ohio Canal will exist of two months in nine, or the ratio of this advantage will be expressed by nine to seven, which is equivalent itself to $28\frac{4}{7}$ per cent. if the use of each month's navigation were the same. But the first month of Spring, and the last month of Autumn, should be the most profitable months of the year, if reference be had to the natural history and consumption of the productions of agriculture and the arts, whether foreign or domestic, which this canal will waft to and fro, between the Southwest and the East. The tobacco, hemp, and salted provisions of Kentucky and Ohio, the cotton and sugar of Tennessee, Mississippi, Alabama, and Louisiana, will profit by the latest, or seek the earliest transit in the year towards the Atlantic, while those manufactures, the consumption of which varies with the season, as the light cottons of the East, and the cloths of the West, will, for Summer and Winter use, be transported early in the Spring, or late in Autumn. It is in the former season, that a peculiar burthen on the Potomac Canal, derived from the inexhaustible fisheries of that river, will seek an inland transportation from the sea board.

A superior advantage to that of latitude will be derived to the

Southern canal, from the consideration, that, while it begins on the navigable waters of the Chesapeake, it connects them, by an *uniform line* of inland navigation, with the populous and thriving regions of the West—the valleys of the Ohio and the Mississippi, and of their numerous tributaries. Much time must elapse before the Erie Canal can hope to derive a substitute for the trade of these valleys, in the improvement of the shores of those lakes which it unites with the Hudson, one border of which is the property of a foreign and rival nation. Even this trade, a canal from Pittsburg to Erie will render common to both. And should, as is much to be desired for the common benefit of the Union, an inland navigation be effected between a point at Pittsburg, common to both Canals and the Erie Canal of New York, still, the completion of the canals about to be constructed, from the Potomac to the Patapsco, from the Chesapeake to the Delaware, and from the Delaware to the Raritan, will render it far easier for the great mart of New York to carry on an extensive trade with the West, by the Southern route, than by her own canal.

In contemplating the relative extent of that bordering country, from which supplies may reach either of these great lines of inland navigation, the comparison which the committee are pursuing will be perplexed with greater difficulty. Still, it is obvious, on the one hand, that, to the North of the Erie Canal, Lake Ontario furnishes, for a large part of its entire line, an unprofitable lake border at no great distance, while, both Pennsylvania and Maryland, through the head-waters of the Delaware and Susquehannah, are endeavoring to draw off to their respective emporiums the productions of the South. From the numerous lakes of New York, and their fertile shores; from the rich bottoms of the Genesee, this canal derives vast supplies for distant transportation; but so will the Chesapeake and Ohio Canal, from a country scarcely less fertile; the lime-stone valleys of the States of Virginia, Maryland, and Pennsylvania, by means of the navigation of extensive rivers, such as the Shenandoah, and the South Branch, or the Monocacy, the Antietam, and the Conogocheague, that only await the completion of the Eastern section of the Chesapeake and Ohio Canal, to pour the produce of their fertile banks upon its bosom. Five hundred miles of *such navigation* are already used, and can be more easily improved than the river Potomac, because it extends along the surfaces of rivers, whose course is parallel to the numerous mountains, through which the Potomac abruptly penetrates. Even those mountains, covered with heavy forests and replete with metallic and mineral treasures, more than make up for the plaster and salt which supply a part of the tonnage of the Erie Canal. (See App. No. 16.)

The Committee, indeed, very confidently believe that, on the single article of coal, an estimate might be founded, sufficient, of itself, to assure a liberal profit, on the entire cost of the Eastern section of the Chesapeake and Ohio Canal. (See App. No. 17.)

The most profitable canals in England, are those that serve to distribute, for consumption, this valuable fuel, which enters as a necessary of life, into the price of all human labor, and constitutes the primum mobile of so many arts.

In no part of that kingdom, however, nor in any region of the United States, East of the Alleghany, can it be drawn from its native beds at so little cost, as at the head of the Potomac navigation, where it is elevated in parallel strata, nearly horizontal, above the surface of the proposed canal, and will be adjacent to its banks, or form a part of them. Less than one cent a bushel, or twenty-eight cents the ton, will be required to load the boats, which transport it; four cents will pay for its transportation, in boats adapted to the canal, from the coal banks to tide water: and allowing five cents for the canal toll on each bushel, it can be sold, in the markets of the District, with a mercantile profit of twenty-five per cent. at 12½ cents the bushel, or very little more than one third of its present cost, in domestic use.

When, added to the other almost innumerable uses of this commodity, that application of it be regarded, which the same region of country favors, (abounding as it does, both in limestone and iron ore,) to the smelting and manufacture of iron, in all its branches, it is difficult to place any limits, but those which the charter of the Chesapeake and Ohio Canal Company annexes, to the future profits of its stock: and no doubt can exist but that the use of this canal, must always exceed in extent that of the canal, which connects the Hudson with Lake Erie. (App. No. 18.)

The Committee have no other purpose in view, in the comparison which they have made between these great national works, for in their utility they both partake of that high character, though happily for New York, they will not, in the resources applied to their construction, than to manifest the expediency of that subscription to the stock of the one which the United States were, when earnestly invited, unable to afford to the other. (App. No. 19.)

There can be no rivalship between two canals which, however, improved, will, at a period not remote, be totally inadequate to waft the boundless supplies, with which the agriculture and the arts, the internal and foreign trade of an immense empire, will crowd their surface.

The committee believe that the time is not far distant, when, if every drop of water that can be commanded for the supply of continuous canals across the elevated summits which divide the Eastern and Western waters, shall be brought in use, the whole quantity will not suffice to waft between them, the exchangeable surplus productions of the labor, enterprise, and capital, of the extensive territories on their borders. (App. No. 20.)

All local interests should learn from this suggestion, if founded in truth, that they have no cause for jealousy, and much for concord, in the great work of internal improvement, of which the Chesapeake and Ohio canal constitutes but a single, though an essential feature.

The committee would have delayed their report, could they have hoped to obtain, in any short period, sufficient data, on which to found an examination of the financial ability of the public treasury to spare in the mode, and at the time proposed, the sum which they have inserted in one of the accompanying bills, as the amount of the United States' subscription to the stock of this canal. (App. No. 21.)

They believe that the completion of the proposed canal, by augmenting the exports, and consequently the imports, of the United States, would bring in to the public treasury, an annual return exceeding greatly the interest on the sum which the Government is invited to subscribe. That return will, also, increase in proportion, as the canal is extended or the payment of the annual instalments of this subscription proceeds. This will not be deemed too sanguine an estimate, when it is reflected, that the freights and commission, and insurance, as well as all other charges of exportation, are paid by the value of those imports which are chargeable, by the customs, with an average duty of not less than twenty-five per cent. If, therefore, an addition be made by the proposed canal, to the amount of those exports, of but one-fifth in value, of the sum subscribed by the United States, the duties on the correspondent imports from abroad, will annually return to the public treasury, more than five per cent. on the total sum subscribed. Such subscription, therefore, will accelerate, rather than retard, the payment of the public debt. (See App. No. 22.)

Sums of money judiciously invested in canals, if they at first yield little profit, are, in truth, but loans, the principal of which is inviolably secure, and their rate of interest certain of speedy and constant augmentation. In the estimate of their probable returns, the commerce which they create, must be added to that which they merely facilitate.

Subscriptions to the structure of canals may be founded on loans, therefore, without affording to posterity cause to complain; since their benefit descends unimpaired with the debt which they contract, the cheap price of the countless blessings which they diffuse.

APPENDIX.

Note 1.

At a Convention of Delegates, from the States of Virginia, Maryland, Pennsylvania, Ohio, and the District of Columbia, holden at the Capitol, in the City of Washington, on the 6th. 7th. and 8th of November, 1823, the following preamble and resolutions were considered and adopted:

Whereas a connection of the Atlantic and Western Waters, by a Canal leading from the Seat of the General Government to the River Ohio, regarded as a local object, is one of the highest importance to the States immediately interested therein, and, considered in a national view, is of inestimable consequence to the future union, security, and happiness, of the United States:

Resolved, unanimously, That it is expedient to substitute for the present defective navigation of the Potomac River above tide water, a navigable Canal by Cumberland to the mouth of Savage Creek, at the Eastern base of the Alleghany, and to extend such Canal, as soon thereafter as practicable, to the highest constant steam boat navigation of the Monongahela or Ohio River.

That the most eligible mode of attaining this object will be by the incorporation of a joint stock company, empowered to cut the said Canal through the territory of the United States, in the District of Columbia, and of the States of Virginia, Maryland, and Pennsylvania; and, therefore, that committees be appointed, each consisting of five delegates, to prepare and present, in behalf of this Assembly, and in co-operation with the Central Committee, hereinafter provided, suitable memorials to the Congress of the United States and the Legislatures of the several States before named, requesting their concurrence in the incorporation of such a Company, and their co-operation, if necessary, in the subscription of funds for the completion of the said Canal.

And whereas, by an act of the General Assembly of the State of Virginia, which passed the 22d of February, 1823, entitled "An act incorporating the Potomac Canal Company," the assent of that State, so far as the limits of her territory renders it necessary, is already given to this *object*, and for *its* enlargement, to the extent required by the preceding resolution, the said act appears to furnish, with proper amendments, a sufficient basis:

Be it therefore Resolved, That it will be expedient to accept the same as a charter for the proposed Company, with the following modifications, viz:

That, in reference to its enlarged purpose, the name be changed to "The Chesapeake and Ohio Canal;"

That provision be made for the assent of the Government of the United States, and of the State of Pennsylvania, to the said act, and that the act be made to correspond in its details with such provision:

That the Union Canal shall be divided into two sections, Eastern and Western; the former of which shall correspond in description with that of the Chesapeake and Ohio Canal by the preceding resolution, and the latter shall begin at the Western extremity of the former, and terminate at the head of the steam-boat navigation of the Monongahela or Ohio River:

That, while the act shall allow a reasonable time for the commencement and the completion of both sections of the Canal, no other forforfeiture shall be incurred, after the Eastern section is finished, for a failure to begin or complete the Western section, within the term prescribed, except of the right to complete such section, and of all interest therein:

That, while the consent of Pennsylvania is provided for, in the amended act, it shall not be indispensably requisite to the validity of the charter, so far as respects the authority granted by it, to extend the Union Canal to the Pennsylvania line:

That it will be both just and expedient, if not absolutely necessary, to limit the interest of the stockholders of the Potomac Company, in the stock of the Chesapeake and Ohio Canal, in the mode provided by the unanimous resolution of the company, of the 7th day of February last, a copy of which is hereto annexed:

That the said Canal shall not, in width, be less at the surface than 40 feet, at its bottom than 28, nor its depth of water be short of four feet, except where, from the nature of the ground, it may be necessary, for the greater security of the banks of the Canal, to reduce its breadth at its base to less than 28 feet:

That the act aforesaid be amended, by inserting, in lieu of the 18th section thereof, the following:

"*And be it further enacted,* The right to the waters of the river Potomac, for the purpose of any lateral Canal or Canals, which the State of Virginia or Maryland may authorize to be made, in connection with the said Canal, is reserved to the said States respectively: That a similar right is reserved to the State of Pennsylvania in relation to the rivers and streams within the territory of that State, the waters of which may be used in supplying the Western section of the said Canal: That the Government of the United States shall retain the power to extend the said Canal in or through the District of Columbia, on either or both sides of the river Potomac: And the State of Maryland or Virginia, shall be empowered, under the sanction given by the United States to this act, to authorize any such extension, for the purpose of meeting any Canal, so extended, by any other Canal, which either State may deem it expedient to conduct, in any direction whatever, through its territory:

"*Provided, however,* That no part of the waters of the river Potomac, or of any other river or stream, required to ensure the constant, safe, and convenient use of the navigation of the Canal hereby au-

thorized to be made, shall be, by any such lateral or continued Canal, diverted therefrom, to the impediment or injury of the said navigation."

That, in addition to the provision contained in the first section of the act aforesaid, there be grounded, on the event of its failure to furnish adequate funds for the completion of the Eastern section of the Canal, to be obtained through separate acts of the respective Governments and Corporations of the States of Maryland and Virginia, of the United States, and of the three cities of the District of Columbia, a subscription to the amount, if necessary, of 2,750,000 dollars, in the following proportions, 2-11ths to be subscribed by the State of Maryland, 3-11ths by the State of Virginia, 4-11ths by the United States, and 2-11ths by the District cities, to be divided between them, according to an equitable ratio, to be fixed by themselves. In case a part of the sum aforesaid shall be subscribed by private individuals, in the mode provided by the act aforesaid, the several States and Corporations, within which such individual subscriptions are received, shall be requested to assume, as part of their aforesaid quotas, the amount of such subscription, under such security as they may deem expedient, for the payment thereof, by the subscribers, to them respectively.

That the Government of the United States be earnstly solicited to obtain the whole of this sum on loan, receivable in four annual instalments, upon the issue of certificates of stock, bearing an annual interest not exceeding five per cent. and irredeemable for thirty years, and to guaranty the repayment thereof on a specific pledge of the public lots in the City of Washington, of the United States' stock in the Canal, and the public faith:

That the first instalment of the loan be made payable on the 1st of March, 1825, and the last on the 1st of March, 1829:

That the interest of each State and Corporation, upon its proportion of the said loan, be paid into the Treasury of the United States, according to the terms of the loan, and the principal sum at the expiration of thirty years, the period to be fixed for its redemption:

That, in the event of a refusal by the Goverment of the United States to negotiate the said loan, each State and Corporation shall provide the amount of its respective subscription, in such manner as may seem to it best.

That the maximum profit of the said Company shall not exceed 15 per cent. after the entire Canal shall have been completed; but if, at any time after the completion of the Eastern section thereof, and before sufficient funds shall have been otherwise provided for the completion of the Western, the tolls of the Canal shall yield a nett income to the stockholders, exceeding 10 per cent per annum, such excess shall be applied towards the extension of the Canal, until the Western section shall have been completed; and, to give more speedy effect to this provision, the President and Directors of the Chesapeake and Ohio Canal Company shall be authorized to borrow, or may negotiate, through a suitable agency, in behalf of the Company, on the

credit of such excess, or on the tolls or a fixed part thereof, levied upon certain commodities passing through the said Canal, being the probable amount of such annual excess, such sums of money as may be deemed expedient, by a general meeting of the stockholders, to be applied to the extension of the Western section of the Canal, from time to time, till the said section shall have been completed And if, after the completion of the entire Canal, the nett dividends shall exceed 15 per cent. per annum, such excess shall be applied, first, to strengthening the works of the Canal, next, to the multiplication of ascending locks from the river Potomac to the level of the Canal, wherever the convenience of the adjacent country may require it; next, to lining the Canal throughout with such walls of stone as shall accommodate its banks to the use of steam boats, and should the nett dividends still exceed 15 per cent. then such excess shall be applied to the reduction of the tolls upon the said Canal, according to some equitable scale.

And be it further resolved, That a Committee of five Delegates be appointed, to prepare, and cause to be presented, in behalf of this Convention, a suitable memorial to the State of Ohio, soliciting the co-operation of that State in the completion of the Chesapeake and Ohio Canal, and its ultimate connection with the navigation of Lake Erie; and that, for the latter purpose, the memorial shall respectfully suggest the expediency of causing the country, between the northernmost bend of the river Ohio, and the southern shore of Lake Erie, together with the waters of Great Beaver and Cayuga Creeks, and all other intervening waters near the said route, to be carefully surveyed, with the view of ascertaining the practicability and probable cost of a canal, which, fed by the latter, shall connect the former;

That a letter be addressed by the Chairman of the Convention to the Mayors of Alexandria, Georgetown, and Washington, apprising, through them, their respective Corporations, of the proceedings of this Convention, and inviting their zealous co-operation in giving to them effect.

That another letter be addressed by the Chairman, in behalf of this Convention, to the President and Directors of the Potomac Company, requesting their concurrence in the measures recommended by the preceding resolutions.

Resolved, That the committee before named be, and they are hereby, authorized and requested to use their best exertions to obtain the most favorable reception for their memorials, to ascertain and communicate to the Central Corresponding Committee, hereinafter named, such objections, if any, as are opposed to the prayers of their respective memorials, and to devise, if possible, in conjunction with the common friends of the union and prosperity of the United States, the means of obviating all the impediments to their success.

Resolved, That, for the last mentioned purpose, the Delegates of the respective Counties and Corporations, represented in this Convention, be regarded also as corresponding Committees, and that 13 delegates be appointed a Central Committee of Correspondence, to confer with

the Committees before named, and to hold stated meetings in the city of Washington, for the purpose of consulting upon, and adopting in behalf of, the Chesapeake and Ohio Canal, such measures as may seem best calculated to assure its certain and speedy completion.

JOSEPH KENT, *Chairman.*

WALTER JONES, *Secretary.*

NOTE 2.

Proposals for opening the navigation of the river Potomac—printed in London in 1773, by John Ballendine.

Whereas the removing the obstructions in the rivers James and Potomac, in the Colony of Virginia, in North America, and thereby making a more easy and *cheap* communication, than there is at present between the several seaport towns on these rivers, and the numerous and populous settlements upon the upper parts thereof; and also between the said seaport towns and the rivers Monongahela and Great Kenhawa, *in the proposed new colony, upon the back of Virginia and Maryland,* will greatly increase the yearly demand for, and consumption of, British manufactures, and promote the culture and importation of hemp, tobacco, flax, &c. into this kingdom: And whereas John Ballendine, of the county of Fairfax, in the said Colony of Virginia, gentleman, being well acquainted with the said rivers, and having skill and judgment in water works, and having already made several useful improvements on and in the said river Potomac, did, in the beginning of the year 1772, represent to the respective Governors and Councils and General Assemblies of the Colonies of Virginia and Maryland, and to the other principal inhabitants thereof, that if they, by their several donations and otherwise, would countenance and encourage his undertaking, he would engage to remove the obstructions in, and render more navigable by locks, &c. than are at present [for *large* boats and barges,] the said rivers James and Potomac, from the tide waters of the same to the *heads* thereof: And to the end that he the said Ballendine might receive every necessary information for the perfect completion of the business aforesaid, he did undertake to embark for the kingdom of Great Britain, and examine the Canal in Scotland from Carron to Clyde, and the canals, locks, &c. of the Duke of Bridgewater, &c. And whereas his Excellency the Earl of Dunmore, Governor of the Colony of Virginia, his Excellency Robert Eden, Esq. Governor of Maryland, the Right Honorable Lord Fairfax, and most of the principal Gentlemen of the said Provinces, were so fully convinced of the knowledge and integrity of the said Ballendine, and of the facility and great utility of rendering the said rivers Potomac and James more extensively navigable than they are at present, *did* therefore, on the 9th day of May 1772, promise and oblige themselves, and their heirs, &c. by a certain instrument of writing, bear-

ing date the same day, to pay to the said Ballendine, and his assigns, the respective sums of money therein written, opposite to their several names, as upon reference being had to a copy of the said instrument (authenticated under the seal of the county of Prince William, in the said Colony of Virginia) will more fully and at large appear: And whereas the said Ballendine, in conformity to his engagement as aforesaid, did embark for this kingdom, and has, since his arrival therein, examined the great Canal in Scotland, and several others in England, and has obtained plans and models of many necessary machines and works, and has engaged several ingenious mechanics to go with him to North America, for the purpose of opening and rendering more easily and extensively navigable, the said rivers James and Potomac: And whereas we, the subscribers, being willing and desirous to co-operate with our fellow subjects in Virginia and Maryland in so beneficial and public spirited an undertaking, do promise and oblige ourselves, and our executors, and administrators, (each for himself, and not one for another) to pay to the said John Ballendine, his heirs and assigns, the following respective sums, written opposite to each of our names, and at the times, and under the conditions and limitations hereafter mentioned; that is to say:

First, That the sums of money hereunto subscribed, and all such farther and other sums as have been or shall be subscribed, either in North America or elsewhere, shall be faithfully and solely applied to, and disposed of, for removing the obstructions in, and rendering more open and extensively navigable, than are at present (as aforesaid) the said rivers Potomac and James, from the tide waters of the same, (or as far as sea vessels do *now* sail *up* these rivers) to such parts of the *heads* of the said rivers; as from *thence* the shortest and most convenient wagon roads can be made, to the rivers Great Kenhawa and Monongehela, in the intended new Colony aforesaid.

Secondly, That the said rivers, from the tide waters thereof to such parts of the *heads* of the same, as aforesaid, shall be *so* opened, and rendered more easily and extensively navigable, as that the intended locks and canals shall *always* have four feet water in them [that being the general depth of the said rivers James and Potomac]—and barges, of at least 50 tons burthen, may also, when laden, be employed on the said rivers from the tide waters thereof, to the heads of the same, as aforesaid.

Thirdly, That inasmuch as it is intended, that the said rivers shall be *so* rendered more open and extensively navigable, by the voluntary subscriptions of gentlemen both in North America and in Great Britain; it is therefore expressly covenanted and conditioned by the subscribers, to and with the said John Ballendine, that no other tax, duty, or impost, shall, at any time hereafter, be laid or levied upon any articles or commodities going up, or being sent down the said rivers Potomac and James as aforesaid, except such only as the respective Legislatures of the Colony of Virginia, and Province of Maryland, shall, by concurrent acts of Assembly, charge the said commodities with, for the sole purpose of paying the expenses attendant on the said

locks and works, and keeping the said rivers, and the channels thereof, *free* from logs or other obstructions, which may occasionally be brought down the same, in the time of freshets.

Fourthly, That the said John Ballendine shall keep a fair and just account of all the particular costs and expenses, which shall arise and be incurred in the removing of the obstructions, erecting locks, &c. in the rivers Potomac and James (as aforesaid) until the same is finished.

Fifthly, That all the said accounts of the costs, expenditures, and charges, as aforesaid, with their several and respective vouchers, shall be submitted to the examination and final adjustment of six gentlemen, to be nominated and appointed as follows, viz: Two thereof to be nominated and appointed by and under the hand and seal of the Governor of the Colony of Virginia for the time being; two to be nominated and appointed by and under the hand and seal of the Governor of the Province of Maryland for the time being; and the remaining two, to be nominated and appointed under the hand and seal of the honorable Thomas Walpole, of the county of Middlesex, in the Kingdom of Great Britain: any four of which said Commissioners, from time to time, meeting, adjusting, and settling the said accounts, and delivering a copy thereof, when so settled, signed by each and every of them to the Governors, severally, of the Provinces aforesaid, to be lodged and deposited by them, in the respective Rolls Office, or Office of Registry in the said Colonies, shall be deemed final and conclusive; and in and by such accounts, and no other, the said Ballendine shall be credited for the costs, expenditures, and charges, as aforesaid, (and also for his expenses to and from this kingdom, and a compensation for his services, &c. as mentioned under the sixth head) and therein likewise shall the said Ballendine be debited for such sum or sums of money, as he shall have received or may receive, in and by virtue of subscription made, or to be made, in Great Britain, or North America, for the purposes aforesaid.

Sixthly, That the said John Ballendine shall be paid out of and from the money so subscribed as aforesaid, such reimbursement for his expenses to and from this kingdom; and also such compensation and reward for his skill, judgment, and industry, in directing, managing, and completing the business of rendering the said rivers, James and Potomac more easily and extensively navigable as aforesaid, as they, the said Commissioners, or any four of them, shall certify under their hands, to the respective Governors of Virginia and Maryland, for the time being, that the services of the said John Ballendine do merit and are entitled to.

Seventhly, That so soon as it shall appear, by a certificate, signed and sealed by the Governors of the Colonies of Virginia and Maryland, respectively, and by two of the Council of each of the said Colonies, that the said John Ballendine has rendered complete and sufficient, by locks and otherwise, as aforesaid, one-half of the whole intended navigation of the said rivers James and Potomac, and that barges, of at least fifty tons burden, can pass loaded up and down the

said rivers, from the tide waters thereof, to the end of the said finished and completed navigation: That then, we, the subscribers, do oblige ourselves, severally, and not jointly, and our several executors and administrators, to pay to the said John Ballendine, his executors, administrators, and assigns, the one moiety or half part of the several following sums of money, written by us opposite to each of our names; and, so soon as the whole of the said intended navigation, on the said rivers James and Potomac, shall be fully made and completed, by locks and otherwise, as that barges of at least fifty tons burden shall, when loaded, as aforesaid, pass up and down the said rivers, from the tide waters thereof, to the heads thereof, as is specified and particularly mentioned under the first head; and so soon, likewise, as the same shall be certified to us, under the hands and seals of the Governors of the Colonies of Virginia and Maryland, respectively, and of two of the Council of each of the said Colonies: That then, we, the subscribers, do, as aforesaid, oblige ourselves, and each and every of our executors and administrators, (severally and not jointly,) to pay to the said John Ballendine, his executors, administrators, and assigns, so much, and *no more*, of the remaining moiety of our following respective subscriptions, as shall (together with the money that may be collected in North America, for the purpose aforesaid) be sufficient to pay the amount of the liquidated and settled accounts of the said Ballendine, as mentioned and described under the fifth head.

In testimony whereof, we have hereunto set our hands and seals, in Great Britain, this——— day of———, one thousand seven hundred and seventy-three.

Transcript from an original contract between Thomas Walpole, W. Pownall, B. Franklin, and Samuel Wharton, relative to the Colony here alluded to.

"We, the Committee of the purchasers of a tract of country for a "new Province on the Ohio, in America, do hereby admit the Ohio "Company as a co-purchaser with us, for two shares of the said "purchase, in consideration of their Agent, Col. * * * * * * to with-"draw the application of the said Company, for a separate grant "within the limits of the said purchase.

"Witness our hands, this 7th day of May, 1770.

"THOMAS WALPOLE,
"W. POWNALL,
"B. FRANKLIN,
"SAMUEL WHARTON.

"The whole being divided into seventy-two equal shares; by the "words 'two shares' above, is understood, two seventy-second parts "of the tract, so as above purchased.

"THOMAS WALPOLE,
"W. POWNALL,
"B. FRANKLIN,
"SAML. WHARTON."

In a printed advertisement dated "London, February 25th, 1773," of the "cost of carriage from the seaports of Georgetown, in Maryland, and Richmond and Alexandria, in Virginia, to the proposed new colony on the Ohio, in North America, by John Ballendine, of Virginia," the following particulars are narrated:

It is proposed by Mr. Ballendine, that the locks intended to be erected in the rivers James and Potomac, shall *always* have four feet water in them, as that is the general depth of these rivers, except in the Spring and Autumn, (which are the great periods of exportation and importation from and into Maryland and Virginia,) when these rivers usually have from 6 to 8 feet water in them.

Mr. Ballendine is thoroughly convinced, from an experience of fifteen years in transporting merchandise up and down the river Potomac, that all kinds of British goods can be carried from Georgetown (which is a seaport on that river, at least twelve miles above Alexandria, where General Braddock landed his troops,) to the head of the North branch of the navigable waters of Potomac, at 6*d.* sterling per hundred weight; and at the same price, also, goods can be carried from Richmond, (a seaport town) on James river, to the head of that river. He proposes, at first, to employ barges of only 60 feet keel, 15 feet wide, and 3 feet in depth, which will not draw more than two feet water. But, when the country on the Ohio is thickly settled, barges of 150 and 200 tons can (as is now done on the Thames) be properly made use of on the rivers James and Potomac.

It requires but three days for the barges to go down the stream, from the head of the North branch of the navigable waters of Potomac, to the seaports of Georgetown and Alexandria; and only the same space of time, from the head of James river, down stream, to the seaport of Richmond, in Virginia; and from thence back again, up stream, to the head of James river, only eight days; and the same time from Georgetown, or Alexandria, up stream, to the head of the navigable waters of the North branch of Potomac.

Mr. Ballendine submits to the consideration of the public, whether a freight, as above, of 6*d.* per hundred weight, will not produce great and uncommon profits to the owners of the barges employed on Potomac and James rivers; for the freight of 50 tons of tobacco, hemp, iron, flax, &c. down stream, from the head of James river to Richmond, or from the head of Potomac to Georgetown or Alexandria, at 6*d.* per hundred weight, will amount to (sterling) £ 25 0 0

Say the barge should carry but half a freight of British merchandise from Georgetown, or Alexandria, or Richmond, up stream, to the head of the Potomac, or James river, at 6*d.* per hundred, it will amount to - -	12	10	0
	£ 37	10	0
Deduct the wages of nine men, at 1*s.* 6*d.* per day, for 14 days, (which is allowing 3 days for loading and unloading) amounting to - - - - - - - -	9	9	0
Profits, on each voyage of 14 days, will be to the bargeman	£ 28	1	

On the first day of August, 1772, Mr. Ballendine went from the head of the North branch of the navigable waters of Potomac, to the river Monongehela, in the proposed Ohio province. He went on purpose to ascertain the distance between these rivers; and, to the best of his judgment, he is convinced it is not, at most, more than ten or eleven miles.

He also ascertained the distance between the navigable head waters of James river, and those of the Great Kenhawa, and found it not to exceed four miles.

Mr. Ballendine has been for many years engaged in iron works, in the back parts of Virginia, and says, that the settled price of wagonage, in that Colony, is eight shillings sterling per day, for each wagon carrying twenty hundred weight; which makes the rate of carriage from the waters of Potomac to those of the Ohio, only 4¾*d.* per hundred weight; and of course it makes the land carriage, between the head of James river and the Great Kenhawa, not half as much.

N. B. It should be here remarked, that, in this estimation, no deduction is made for the back carriage of hemp, &c. from the New Province to the waters of Potomac, or James river.

Total expense of transportation from Alexandria or Richmond, in Virginia, or Georgetown, in Maryland, to the New Province, will not be more than as follows, viz:

By the barges, to the head waters of Potomac or James river, at 6*d.* per hundred, - - - - -	£0	0	6
By the wagons from thence to the navigable waters of Monongehela, 4¾*d.* (or to the Great Kenhawa, not above 2*d.*) - - - - -	0	0	4¾
Total per hundred weight, - - - -	£0	0	10¾

The expenditures of the Potomac Company are stated in the following table accompanying a letter from the President of the Company to the Virginia and Maryland Commissioners, in 1822:

	NO. SHARES.	AMOUNT.
1st, Capital, or dividing stock, at 100*l.* sterling,	700	$ 311,111 11
2d, Shares held by the State of Virginia,	120	53,333 33⅓
Shares held by the State of Maryland,	220	97,777 77
Shares held by individuals,	360	160,000 00
	700	311,111 11
3d, Total amount expended from the commencement in 1784, to 1st of August, 1822, including original improvements, repairs, interest paid on borrowed money, expenses of collecting tolls, &c.	-	$ 729,387 29
4th, Debts due by the company to 1st August, 1822, including interest:		
To subscribers to Monocacy loan, contracted 1803,	-	3,876 49
Do Shenandoah loan, 1812,	-	4,608 77
Do Antietam loan, 1812,	-	17,026 33
Do Cumberland loan, 1813,	-	7,642 12
State of Maryland, 1814,	-	39,950 00
Banks of the District of Columbia, including interest, whereof $ 55,955 17 was contracted between the years 1803 and 1816, and the remainder in 1816, '17, and '18,	-	101,192 88
Sundry persons,	-	1,500 00
		$ 175,886 59

NOTE.—Although $ 311,111 11, as stated above, is really the sum of the capital stock or dividing capital, the amount of $ 336,551 10 was actually paid in, the difference, $ 25,439 99, was sunk to the profit of the present stockholders, by the sale of delinquent shares.

J. MOORE, JR. *Treasurer.*

Brief description of the Works executed by the Potomac Company, with the lockage and command of water thereon.

The Potomac Company, in pursuance of the powers granted to them, by their charter, have executed the following works:

1st. Large canals taken out of the river Potomac, and conveyed through locks around the principal Falls. Of these, the chief are the works of the Great Falls, where the difference of level, 76 feet 9 inches, is surmounted by a series of 5 sets of locks, of solid masonry of stone, each 100 feet in length, of the various width of from 10 to 14 feet; of the lift of from 10 to 18 feet; and of the cubical contents of from 18,000 to 25,000 feet; a set of guard-locks, and extensive basin. And a canal, in length 1200 yards, lined with walls of stone. Of the lock seats, the two lower pair have been excavated entirely from the solid rock, and exhibit an imperishable monument of perseverance and skill.

At this situation, the Potomac Company have acquired, in *fee simple*, 16 acres of land, at an uniform width of 140 feet, for the location of the canal and locks and 1 acre further, for the erection of necessary buildings.

At the Little or Lower Falls, the difference of level, 37 feet 1 inch is surmounted by a series of 4 sets of locks, of solid masonry of stone, of the dimensions of 80 feet in length, and 12 in width; and by a canal 2½ miles long, on the margin of which are found inexhaustible supplies of excellent and valuable stone, for building purposes; all which are within the land acquired by the Company *in fee simple*. The quantity of land so possessed here by the Company, is 53 acres and 3 roods, at a constant width of 180 feet, and also one acre for the erection of necessary buildings.

The canals at both the Great and Little Falls, are excavated of the following dimensions:

25 feet wide at surface
20 " " bottom
4 " deep

2d. Works, erections of walls, and excavations in the body of the river, in order to confine the passages of the water within canals, of widths varying from 16 to 25 feet.

Dams of stone run across the river, leaving openings or sluices of similar width; by which the water was raised in the river above them.

Removals of large stones and masses of rock, which presented obstacles to the passage of boats in the various channels of the river.

Similar to these were works executed on the Monocacy, Antietam, and Conogocheague Rivers, and very extensive operations upon the Shenandoah.

Under the improved mode of modern navigation by independent canals, the 2nd class of works, erected at enormous expense, at a time when such operations were completely new in the United States, and in the absence of that experience which modern times have derived

from the enlargement of scientific research, and the now constant application of practical skill in works of civil engineering, have been found to be entirely useless. And the property, rights, and privileges, of the Potomac Company, in and upon the river Shenandoah, have been by them long since conveyed, for certain considerations, to the Shenandoah Company—who now enjoy the same.

An extract from the appendix annexed to the report of the Committee on the District of Columbia, to the House of Representatives, on the 3d of May, 1822.

"The principal Canals on the Potomac are at the mouth of the Shenandoah, and at the Great and Little Falls." They afford 15 feet, 76 feet 9 inches, and 37 feet 6 inches fall, respectively. The Canal around the Seneca Falls affords a descent of 7 feet, that at House's Fall, 3 feet. They may be made to command the entire water of the river, after reserving enough for the purposes of navigation."

The effect of these expenditures in improving the navigation of the Potomac may be inferred from the following extract from the report of the Virginia and Maryland Commissioners, printed by order of the Senate of the United States, January 27, 1823:

The present state of the Navigation.

"It has been stated, and is believed by many persons, that the river Potomac, in its present condition, is navigable nearly half the year. The Potomac Company are required to give a low water navigation, of a foot deep, throughout the year. This circumstance, and the idea entertained of the possibility of confining the waters in the bed of the river to narrow sluices, have confirmed this opinion. The commissioners have given a minute examination to this branch of the duties imposed upon them, and satisfied themselves, from their own observations, and the most careful inquiries, that no such blessing is enjoyed by the fertile districts through which the river flows.

"The floods and freshets give the only navigation at present used. They occur usually from the 1st Sept. to the 20th June, variously however, in various years. And it so happens, that, although boats are known, in some years, to pass down, through each of the months intervening between these dates, yet, in consequence of the ice, during winter, and the short continuance of a flood giving navigable water, the average duration of the boating time, in a course of many years, does not much, if at all, exceed eight or ten days passable water for full loaded boats, late in the year, and from twenty-five to thirty-five

days in the Spring of the year, making the whole time, when produce and goods can be stream-borne, in the course of one entire common year, from thirty-three to forty-five days. The duration of this period necessarily increases as you approach the Great Falls, and decreases as you ascend to the head of the river. The evils attending the present state of the navigation lessen the benefits which might be supposed to be derived from even this short period. They chiefly consist in its uncertainty and dependance on the vicissitudes of the seasons; in the great rapidity of the current of the river, in consequence of the great fall or inclination of its plane, in proportion to its length; in its dangerous character, arising from the wildness of the torrent, and the suddenness of its courses and meanders—having worn its devious way, in the lapse of ages, through countless ridges of rocks and mountains; and, in consequence of huge fragments of rocks and large loose stones, the remains of the wasted mountains, scattered thickly, and in some places rising over the entire bed of the river, and leaving no passage for loaded boats, impelled by the rapid and impetuous current, but what may be found by warping and winding, with the utmost exertion of strength, agility, and watchfulness, on the part of the crew, through a most irregular course. By these dangers many boats and cargoes are destroyed. The uncertainty and the shortness of the duration of the floods are the very worst features in the character of this navigation. This uncertainty frequently occasions the most ruinous disappointments to the farmers, millers, and merchants. The expected rains are often denied, and the consequence frequently is, that contracts cannot be complied with, which occasion loss and ruin. Sometimes, a small rise, and deceitful appearances, induce a collection of the scattered crews of the boatmen from the mountains, and a general shipment of produce; by the time they have descended forty or fifty miles down the river, a fall in the water takes place; the boats are compelled to stop, and their storage, increased expenses, neglect of agents, and natural causes, waste the profits, or damage the produce of all concerned. This chiefly occurs in the upper part of the river. Sometimes the rains come on sooner than they are expected, and the rise and fall on the river succeed each other before the farmers are prepared to make their shipments; then the crops lie on hand till next year, subject to all the inconveniences and losses accompanying such circumstances. And when the floods are most propitious, and the navigation is the best, under existing circumstances, the usual consequence is, that the produce of immense districts of country, among the most fertile in the Union, is all forced into market at one time, and a capital, which might be sufficient to give better prices, if the merchant had time to receive the proceeds of one investment before he made a second, is found inadequate to give a fair price, to all, under such disadvantages. Thus, the farmer has frequently no alternative left but to sacrifice the fruits of his year's labor. The expenses are already too great, and produce will bear no additional cost or risk of shipping farther; and, to carry it home again is impossible; for, sometimes, even the boat which brought it

down, cannot be floated back empty. It is surely to be lamented that wretched as is this navigation, it is the sole dependance of a vast extent of country, which, in spite of its fertility, and the value of its inexhaustible minerals of the most useful kind, is most evidently drooping and suffering, for want of a ready market for its productions, without which stimulus it is impossible for its agriculture to flourish, or its natural resources to be developed."

NOTE 3.

An extract from the message of the Governor of Virginia, (ex officio) President of the Board of Public Works, to the House of Delegates, dated December 27th, 1820:

"*The Potomac river, and its connection with the Ohio.*

"The 30th of the 6th month, 1820, I commenced the examination. From the topography of the country it appears that a communication between the Potomac and the Ohio ought to be either by way of Ohio or Youghiogany rivers.

"If the waters of the Youghiogany should be preferred, then a branch called Deep Creek will be most eligible. There are several branches of this creek, which form a junction and compose a stream which may do tolerably well to supply the summit level of a canal. This junction is about two miles West of a low gap in the Alleghany ridge, which has been long spoken of as a suitable point of connection between the Eastern and Western Waters.

"From this gap the levels were taken both ways. It was found that the fall Westward to the point mentioned on Deep Creek was 204.03 feet. The fall Eastward to the junction of two branches of Crabtree Run, just above General Swann's old mill, is 340.90 feet. The distance by estimation rather less than two miles.

"The fall from the last mentioned point to the mouth of Savage river, is 1366.71 feet. The distance not measured, but believed to be about 13 miles.

"It appears then that the waters of Deep Creek are 136.87 feet higher than the water of Crabtree Run at Swann's old mill, and of course might be brought through by a tunnel, and discharged into the Potomac. In case of a canal navigation the tunnel would be on the summit level, and the water of Deep Creek would supply locks both ways.

"This creek lies in the glades, and the ascent from it towards the ridge but small, for a considerable distance. I think, therefore, that, by driving up an open canal as far as the ground would permit, and then taking the shortest possible distance to the same level on the other side, the tunnel would not exceed two miles in length. I believe a road might be made across the ridge from one point to the other, that is, from Deep Creek to Swann's mill, at three degrees of descent and elevation that would not exceed five miles in distance."

Extract from the report of the Committee of the District of Columbia, of the 3d of May, 1822, upon certain memorials of the inhabitants of Virginia, Maryland, and Pennsylvania, praying the aid of the General Government towards the improvement of the navigation of the river Potomac.

"A hasty survey of the general map of the United States, and a brief recurrence to the theory and policy of the Federal Government, with their practical illustration by the structure of the Cumberland road, would seem to almost supersede the necessity of any comment, from your committee, on the importance of the navigation of the Potomac, or the power of Congress to provide for its improvement.

One of its southern branches, itself a considerable river, rises to the southwest of Staunton, in Virginia, and is capable of connecting, by a navigable canal, the geographical centre of that State, in territory the largest in the Union, with the market towns of the District of Columbia. Emptying into the Potomac above the chief obstructions of its navigation, the Shenandoah, like those navigable streams which descend from the northwest, thro' the limestone valleys of Maryland and Pennsylvania, depends for an outlet to the ocean, on the improvement of the navigation of the main river, to a considerable distance above tide water. These branches, when the stem shall have been improved, are capable of affording, with the Potomac, an internal water communication exceeding, in extent, 650 miles.

The value of this navigation to the ample and fruitful territory washed by the tide, or drained by the tributary streams of this noble river, a territory comprehending four counties of Pennsylvania, seven of Maryland, and eighteen of Virginia, exceeding, in extent and population, some of the largest States of the Union, should not be disregarded. It sinks, however, into comparative insignificance, when this river is contemplated as a necessary link of the shortest chain of communication between the Atlantic and western States. The enlightened policy which seated the Federal Government on the banks of the Potomac, indicates its peculiar adaptation to this purpose; and nature has facilitated its accomplishment, by a rupture of the many ranges of lofty mountains, including even the great ridge of the Alleghany, in the direction which such a purpose requires. It is no longer questionable but that the head waters of the Ohio may be mingled with those of the Potomac, by a tunnel or a subterranean canal, not exceeding two miles in extent; and the produce of the soil and industry of the west, after ascending the Youghiogany, find a safe and commodious channel; thence to the valley of Savage Creek, and through it, the north branch, and the main river to the Chesapeake and the Atlantic."

Extract from the Report of the Commissioners appointed by the States of Virginia and Maryland to survey the river Potomac, &c., dated December 19th, 1822.

"The territorial feature of the United States, which is most important to all our relations, political, commercial, and social, is the extensive range of mountainous region which divides the rivers falling into the Mississippi from those which fall into the Atlantic ocean. It forms a wall of separation between the West and East, and the difficulties it presents has diverted the Western commerce from the nearest seaports, and caused its general current to seek distant outlets around its Southern and Northern extremities. Such, however, is the wise arrangement of Providence, that, where the evils resulting from this great barrier operate most severely, that is, nearest to its centre, it has placed the remedy within our reach. Of all the rivers which reciprocally drain the lands beyond and on this side the mountains, the Ohio on the one side, and the Potomac on the other, extend their ramifications, of which any use can be made, nearest to the summit and level of the dividing ridge. Such, also, is the favorable shape of the mountains at this point, where these waters approach nearest, that its flattened surface forms extensive and luxuriant meadows, called glades. A well known operation of the laws of nature, at this elevated point, at all times many degrees cooler than the surrounding air, condenses the vapors and attracts the clouds rising on either side of the mountains, so that these elevated plains or glades, in the driest season, are copiously supplied with water, and afford rich and abundant pasturage, when all the valleys below them are parched with drought. Deep Creek is a Western stream falling into the Youghiogany, which forms in these glades, and is situated at that point from which the Commissioners commenced their measurement, within two hundred and four feet of the summit of the dividing ridge, and can be brought, by a cut, within two miles of a branch of Savage river, called Crabtree Run, at the junction of its branches at Swan's old Mill, on this side of the mountains. Deep Creek is a copious stream, with the banks nearly perpendicular, running through the soft earth of the glades, and was, in the season when they examined it, (supposed to be the driest which has occurred within the memory of most men living) from three to four feet deep, and from nine to twelve feet wide, with a current of about one and an half miles to the hour. There is a narrow pass in a ridge of the glades, through which Deep Creek makes its way; where, by erecting a dam, fifteen or twenty feet high, and not more than forty or fifty yards long, these meadows may be inundated, and an immense pond may be formed, equal at least to three or four miles in length, and half a mile in breadth. This reservoir, it is believed, would furnish sufficient water for locks and a canal, if carried through the dividing ridge by a tunnel, two miles long, to descend and ascend both sides of the mountains, to the Monongahela on the West, and to Savage river on the East, especially when recruited, as you descended by Big Youghio-

gany. on the West side, and by Crabtree Run on the East side, respectively. The fact was not ascertained, but from the position of the sources of Little Youghiogany, it is believed they might easily be conveyed into the same reservoir."

Extract from the President's Message to Congress, at the commencement of the Session, Dec. 3, 1823.

"Many patriotic and enlightened citizens, who have made the subject an object of particular investigation, have suggested an improvement of still greater importance. They are of opinion that the waters of the Chesapeake and Ohio may be connected together by one continued canal, and at an expense far short of the value and importance of the object to be obtained. If this could be accomplished, it is impossible to calculate the beneficial consequences which would result from it. A great portion of the produce of the very fertile country through which it would pass, would find a market through that channel. Troops might be moved with great facility in war, with cannon, and every kind of munition, and in either direction. Connecting the Atlantic with the Western country, in a line passing through the Seat of the National Government, it would contribute essentially to strengthen the bond of union itself. Believing, as I do, that Congress possess the right to appropriate money for such a national object, (the jurisdiction remaining to the States through which the canal would pass,) I submit it to your consideration whether it may not be advisable to authorize, by an adequate appropriation, the employment of a suitable number of the officers of the Corps of Engineers, to examine the unexplored ground, during the next season, and to report their opinion thereon. It will likewise be proper to extend their examination to the several routes through which the waters of the Ohio may be connected, by canals, with those of Lake Erie."

Extract from a message from the President of the United States, of the 14th of February, 1825. *transmitting to the House of Representatives a report of the United States Board of Internal Improvement to the Chief of the Engineer Corps.*

"In execution of the orders of the Secretary of War, communicated in your letter of the 31st May last, "to make a reconnoissance of the country between the waters of the Potomac and the head of steam boat navigation of the Ohio, and between the Ohio and Lake Erie, for the purpose of ascertaining the practicability of a communication between these points; of designating the most suitable route for the same; and of forming plans and estimates, in detail, of the expense of execution:" the Board proceeded from the seat of govern-

ment, through the portion of country indicated therein. Having deliberately examined every local circumstance on that part of the Allegany mountain which lies between the head waters of the Potomac and those of the Youghiogany, a branch of the Monongahela, the Board prepared instructions for the preliminary surveys and measurements to be executed by the Topographical Engineers and other officers and gentlemen attached for this service; and having now maturely considered the circumstances observed by them personally, and carefully studied the results of such of these preliminary surveys as are completed, *they are decidedly of opinion that the communication is practicable.*

The Board, on viewing the country between the Ohio and Lake Erie, along various lines indicated by public opinion, became possessed of such facts as place the practicability of canalling, from the head of steam boat navigation, in the Ohio, to Lake Erie, beyond all doubt. The information collected by the Board is not, however, of a nature to enable them to decide which of the several routes deserves a preference; and a definitive choice can only be made after the several surveys, indicated by the extract from the record of the Board, herewith, shall have been executed."

Further extracts from the same report.

"On the whole, the western section of the canal, from the mouth of Bear Creek to that of the Monongahela, at Pittsburg, offers no obstacles which may not be surmounted at a reasonable expense; and the waters of the Youghiogany, Bear Creek, and Cassellman's river, are amply sufficient to feed it. Large reservoirs may be formed in Bear Creek and Cassellman's river, by throwing dams across them, and on the route from Cassellman's to the Paper mills, and at the mouth of the Youghiogany in the Monongahela. The practicability of this section is out of question.

Its length will be about 100 miles, and its descent from Bear creek to Pittsburg 584½ feet, as Pittsburg is 756 feet above the level of the ocean.

The investigation of the topography and water courses of the country through which the Chesapeake and Ohio canal should run, and the results of our preparatory surveys, obtained up to the present moment, demonstrate that this noble enterprize is practicable; and although we have not yet sufficient data to calculate the expense of the work, there is every probability that it will not bear any comparison with the political, commercial, and military advantages which it will procure to the Union."

NOTE 4.

ACT OF THE STATE OF VIRGINIA.

An act incorporating the Chesapeake and Ohio Canal Company.—[*Passed January 27, 1824.*]

Whereas a navigable canal from the tide water of the river Potomac, in the District of Columbia, to the mouth of Savage Creek, on the north branch of said river, and extending thence, across the Alleghany mountain, to some convenient point of the navigable waters of the river Ohio, or some one of its tributary streams, to be fed through its course on the east side of the mountain, by the river Potomac and the streams which empty therein, and on the western side of the mountain, and in passing over the same, by all such streams of water as may be beneficially drawn thereto by feeders, dams, or any other practicable mode, will be a work of great profit and advantage to the people of this State, and of the neighboring States, and may ultimately tend to establish a connected navigation between the eastern and western waters, so as to extend and multiply the means and facilities of internal commerce, and personal intercourse between the two great sections of the United States, and to interweave more closely all the mutual interests and affections that are calculated to consolidate and perpetuate the vital principles of Union; and whereas it is represented to this General Assembly, that the Potomac Company are willing and desirous that a charter shall be granted to a new company upon the terms and conditions hereinafter expressed; and that the charter of the present company shall cease and determine:

Be it therefore enacted by the General Assembly of Virginia, That, as soon as the Legislatures of Maryland and Pennsylvania, and the Congress of the United States, shall assent to the provisions of this act, and the Potomac company shall have signified their assent to the same, by their corporate act, a copy whereof shall be delivered to the Executives of the several States aforesaid, and to the Secretary of the Treasury of the United States, there shall be appointed by the said Executives and the President of the United States, three commissioners on the part of each State, and the Government of the United States, any one of whom shall be competent to act for his respective government. The said commissioners shall cause books to be opened at such times and places as they shall think fit, in their respective States, and the District of Columbia, under the management of such persons as they shall appoint, for receiving subscriptions to the capital stock of the company hereinafter incorporated; which subscriptions may be made, either in person or by power of attorney: and notice shall be given in such manner as may be deemed advisable, by one or more of the said commissioners, of the time and places of opening the books.

2. And the said commissioners shall cause the books to be kept open at least forty days. And within twenty days after the expiration thereof, shall call a general meeting of the subscribers at the city

of Washington, of which meeting notice shall be given, by a majority of the commissioners aforesaid, in at least four of the newspapers printed in Pennsylvania, Maryland, Virginia, and the District of Columbia, at least twenty days next before the said meeting, and such meeting shall, and may be continued from day to day until the business is finished; and the commissioners, at the time and place aforesaid, shall lay before such of the subscribers as shall meet according to the said notice, the book containing the state of the said subscriptions; and if one fourth of the capital sum of six million of dollars should appear not to have been subscribed, then the said commissioners, or a majority of them, at the said meeting, are empowered to take and receive subscriptions to make up such deficiency, and may continue to take and receive such subscription for the term of twelve months thereafter; and a just and true list of all the subscribers, with the sum subscribed by each, shall be made out, and returned by the said commissioners, or by a majority of them, under their hands, to the Board of Public Works, of this State, to the Governor and Council of the State of Maryland, to the Secretary of State of the State of Pennsylvania, and to the Secretary of the Treasury of the United States, to be carefully preserved; and in case more than six millions of dollars shall be subscribed, then the sum subscribed shall be reduced to that amount, by the said commissioners, or a majority of them, by beginning at and striking off a share from the largest subscription or subscriptions, and continuing to strike off a share from all subscriptions under the largest and above one share, until the same is reduced to the capital aforesaid, or until a share is taken from all subscriptions above one share; and lots shall be drawn between subscribers of equal sums, to determine the number of shares which each subscriber shall be allowed to hold, on a list to be made for striking off as aforesaid; and if the sum subscribed still exceed the capital aforesaid, then to strike off, by the same rule, until the sum subscribed is reduced to the capital aforesaid, or all the subscriptions reduced to one share respectively; and, if there still be an excess, then lots shall be drawn to determine the subscribers who are to be excluded, in order to reduce the subscription to the capital aforesaid: which striking off shall be certified on the lists aforesaid: and the said capital stock of the company hereby incorporated, shall consist of six millions of dollars, divided into sixty thousand shares, of one hundred dollars each: of which every person subscribing may take, and subscribe for one or more whole shares; and such subscriptions may be paid and discharged either in the legal currency of the United States, or in the certificates of stock of the present Potomac company, at the par or nominal value thereof, or in the claims of the creditors of the said company, certified by the acting president and directors to have been due, for principal and debt, on the day on which the assent of the said company shall have been signified by their corporate act as hereinbefore required; *Provided*, that the said certificates of stock shall not exceed, in the whole amount, the sum of three hundred and eleven thousand one hundred and eleven dollars and eleven cents; nor the

said claims the sum of one hundred and seventy-five thousand eight hundred dollars; *Provided, also,* that the stock so paid for in certificates of the stock of the present company, and of the debts due from the said company, shall be entitled to dividend, only as hereinafter provided: and that no payment shall be received, in such certificates of stock, until the Potomac company shall have executed the conveyance prescribed by the thirteenth section of this act: *And, provided,* that, unless one fourth of the said capital shall be subscribed, as aforesaid, all subscriptions made in consequence of this act, shall be void; and, in case one-fourth, and less than the whole capital, shall be subscribed as aforesaid, then the said commissioners, or a majority of them, are hereby empowered and directed to take and receive the subscriptions, which shall first be offered in whole shares, as aforesaid, until the deficiency shall be made up; a certificate of which additional subscription shall be made, under the hands of said commissioners, or a majority of them, for the time being, and returned as aforesaid.

3. *And be it further enacted,* That, whenever one fourth, or a greater part of the said stock shall have been subscribed, in the manner aforesaid, then the subscribers, their heirs, and assigns, shall be, and are hereby declared to be, incorporated into a company, by the name of the "Chesapeake and Ohio Canal Company," and may sue, and be sued, and, as such, shall have perpetual succession, and a common seal; and the estates, rights, and interests of the said company, shall be adjudged and taken in law to be real estate; and it shall, thereupon, be the duty of the said commissioners, or a majority of them, to call a general meeting of the said subscribers, at such time and place, as they, or a majority of them, shall appoint, after advertising the same, in such public prints as they, or a majority of them, may think proper; and such of the said subscribers as shall be present at the said meeting, or a majority of them, are hereby empowered and required to elect a president and six directors, for conducting the said undertaking, and managing all the said company's business and concerns; for, and during such time, not exceeding three years, as the said subscribers, or a majority of them, shall think fit; and, in counting the votes of all general meetings of the said company, each member shall be allowed one vote for every share, as far as ten shares, and one vote for every five shares above ten, by him or her held at the time, in the stock of the said company: and any proprietor, by writing under his or her hand, executed before two witnesses, may depute any other member or proprietor to vote and act as proxy for him or her, at any general meeting: *Provided, also,* That no officer or director of said company shall, under any circumstances, be allowed to vote on any stock but his own.

4. *And be it further enacted* That the said president and directors, and their successors, or a majority of them, assembled, shall have full power and authority to appoint, and, at their pleasure, dismiss such engineer or engineers, and agent or agents, as they may deem expedient, and to fix their compensation; and to agree with any per-

son or persons, on behalf of the said company, to cut canals, erect dams, open feeders, construct locks, and perform such other works, as they shall judge necessary or expedient for completing the canal hereinbefore mentioned and described; and, out of the money arising from the subscriptions and tolls, and other aids, hereinafter given, to pay for the same, and to repair and keep in order the said canals, locks, and other works necessary thereto, and to defray all incidental charges; and also to appoint a treasurer, clerk, and other officers, toll-gatherers, managers, and servants, as they shall judge requisite, and to agree for, and settle, their respective wages or allowances; and to settle, pass, and sign their accounts; and also to make and establish rules of proceeding, and to transact all other business and concerns of the said company, in, and during the intervals between the general meetings of the same; and they shall be allowed, as a compensation for their trouble therein, such sum of money as shall, by a general meeting of the stockholders, be determined: *Provided, always,* That the Treasurer shall give bond, in such penalty, and with such security, as the said president and directors, or a majority of them, shall direct for the true and faithful discharge of the trust reposed in him, and that the allowance to be made him for his services: shall not exceed three dollars in the hundred for the disbursements by him made; and that no officer in the company shall have any vote in the settlement or passing of his own account.

5. *And be it further enacted,* That, on all subscriptions which shall not be paid, as hereinbefore provided, in the certificates of the stock, or debts of the present Potomac company, there shall be paid at the time of subscription, on each share one dollar; and thereafter when the company shall be formed, the stock subscribed shall be paid on such instalments, and at such times, as the President and directors shall, from time to time, require, as the work advances: *Provided,* That not more than one-third part shall be demanded within any year from the commencement of the work: *nor any payment demanded, within any year from the commencement of the work*;* nor any payment demanded, until at least sixty days public notice thereof shall have been given, in such public newspapers as the said president and directors shall direct such notices to be published in; and, whenever any subscriber shall fail to pay any instalment, called for by the company, it shall and may be lawful for the company, upon motion to be made in any court of record, after ten days' notice, to obtain judgment against the subscriber so failing to pay: or the said company, at their option, may, after giving sixty days notice, in such public newspaper, printed within the District of Columbia, as they may judge proper, sell the stock of such subscriber; and, if the proceeds of any such sale shall exceed the sum demanded, the surplus, after paying the expenses of such sale, shall be paid to the subscriber so failing, or to his legal representatives; and the purchaser, at such sale, shall become a stockholder, and be subject to the same rules and regulations, and en-

* The preceding clause, in italics, has been evidently inserted and retained through inadvertance in engrossing the original Bill. Judicial construction, it is believed, will afford for the error an adequate corrective.

titled to the same privileges, rights, and emoluments, as original subscribers under this act.

6. And to continue the succession of the said president and directors, and to keep up the same number; *Be it enacted*, That, from time to time, upon the expiration of the said term for which the said president and directors were appointed, the stockholders of the said company, at the next general meeting, shall either continue the said president and directors, or any of them, or choose others in their stead, and, until such choice be made, the president and directors for the time being, shall continue in office; and in case of the death, removal, resignation, or incapacity of the president, or any of the said directors, may and shall, in manner aforesaid, elect any other person or persons to be president and directors, in the room of him or them so dying, removing, or resigning; and may, at any of their general meetings, remove the president or any of the directors, and appoint others for and during the remainder of the term for which such person or persons were at first to have acted.

7. *And be it enacted*, That every president and director, before he acts as such, shall take an oath or affirmation for the due execution of his office.

8. *And be it enacted*, That the presence of stockholders, having a major part of the stock at least, shall be necessary to constitute a general meeting of the stockholders, which shall be held on the first Monday in June in every year, at such convenient town or place as shall be, from time to time, appointed by the said general meeting: but, if a sufficient number shall not attend on that day, the stockholders who do attend, may adjourn from time to time, until the stockholders holding the major part of the stock do attend, and the business of the company is finished; to which meeting the president and directors shall make report, and render distinct accounts of all their proceedings; and, on finding them fairly and justly stated, the stockholders then present, or a majority of them, shall give a certificate thereof, a duplicate of which shall be entered on the company's books; and at such yearly general meetings, after leaving in the hands of the treasurer such sums as the stockholders, or a majority of them, shall judge necessary for repairs and contingent charges, an equal dividend of all the nett profits arising from the tolls hereby granted, shall be ordered and made to and among all the stockholders of the said company, in proportion to their several shares, subject to the provisions and enactments hereinafter declared; and, upon any emergency in the interval between the said yearly meetings, the said president, or a majority of the said directors, may appoint a general meeting of the stockholders of the company, at any convenient town or place, giving at least one month's previous notice, in at least four of the newspapers in Pennsylvania, Maryland, Virginia, and the District of Columbia; which meeting may be adjourned and continued as aforesaid: and in case the stockholders, or a majority of them, in any general meeting aforesaid, shall deem it expedient to order a semi-annual, rather than a yearly dividend as aforesaid, then, in like manner, with like notice, and under like restrictions, there shall be a half-yearly, or semi-annual dividend of nett profits declared and paid.

9. *And be it enacted*, That, for and in consideration of the expenses the said stockholders will be at, not only in cutting the said canal, erecting locks and dams, providing aqueducts, feeders, and other works, and in improving and keeping the same in repair, the said canal and all other works aforesaid, or required to improve the navigation thereof, at any time hereafter, with all their profits, subject to the limitations herein provided, and to none other, shall be, and the same are hereby, vested in the said stockholders, their heirs and assigns, forever, as tenants in common, in proportion to their respective shares, and be forever exempt from the payment of any tax, imposition, or assessment, whatsoever; and that it shall and may be lawful for the said president and directors, at all times, forever hereafter, to demand and receive, at such places as shall hereafter be appointed by the president and directors aforesaid, tolls for the passage of vessels, boats, rafts, produce, and all other articles, at such rates as the said president and directors may hereafter allow and establish, according to the provisions of this act.

10. *And be it enacted*, That, if the commissioners hereby required to be appointed, shall die, resign, or refuse to act, the vacancy occasioned thereby shall be filled by the same authority by which the original appointment was made; and the person or persons appointed to fill such vacancy, shall have all the power and authority which was vested in the commissioner whose place he or they shall be appointed to supply; and when any part of the canal aforesaid shall have been completed, according to the true intent and meaning of this act, the president and directors of the company hereby created, shall have power, and it shall be their duty to ordain and establish a rate of tolls to be paid upon boats, vessels, rafts, or other property, passing on the part of the canal so completed, and so, from time to time, as part or parts shall be completed; and until the Eastern section thereof shall be finished up to the mouth of Savage river or creek; and, thereafter, until the entire canal shall have been finished according to the true intent and meaning of this act. For the collection of which tolls, the president and directors shall have power to establish so many toll houses, and at their pleasure to appoint and remove so many collectors, and at such places as from time to time they may judge expedient; and the said president and directors shall have full authority, subject to the direction and control of a majority, in interest, of the stockholders represented in any general meeting, to regulate and fix a tariff of tolls, not exceeding an average of two cents per ton per mile; and so to adjust the said tolls, in relation to the capacity or burthen of the boats, and the dimensions of the rafts passing the locks of the said canal, as to promote economy of water and time in the navigation thereof.

11. *And be it enacted*, That the president and directors shall, annually, or semi-annually, declare and make such dividend of the nett profits, from the tolls to be received according to the provisions of this act, and from the other resources of the company, as they may deem advisable, after deducting therefrom the necessary current, and

the probable contingent expenses, to be divided among the proprietors of the stock of the said company, in proportion to their respective shares, in manner following: that is to say: if such nett profits shall not exceed ten per cent. on the amount of shares, which shall have been paid for in the current money of the United States, and expended on the Eastern section of the said canal, then the whole thereof shall be divided among the holders of such shares, in proportion to their respective shares; but, if such nett profits shall exceed the rate of ten per cent. per annum in any year, on such amount of stock, then the surplus shall be divided among such stockholders as shall have paid for their shares in certificates of the debts of the Potomac Company, until they shall therefrom have received a dividend of six per cent.: and, if a surplus yet remain, the same shall be divided among the stockholders who shall have paid for their shares in certificates of the stock of the Potomac Company, until they shall have received therefrom a dividend of six per cent. per annum on such shares; and if a surplus still remain, so long as the Western section of the canal shall remain unfinished, such surplus shall be applied, from time to time, to the construction and completion thereof, in such mode as the president and directors, under such rules and regulations, not inconsistent with the Constitution of the United States, or of the several States aforesaid, as the stockholders, or a majority thereof, in general meeting, may prescribe, until the Western section of the canal shall be also completed; after which, if such surplus shall still arise, the same shall be divided among all the Stockholders, without discrimination, in proportion to their respective shares, until the annual dividend thereon shall have reached fifteen per cent. beyond which it shall never extend. But should the nett revenue of the company exceed that amount for any two years in succession, then such excess shall be applied, by the president and directors, in such mode as shall be agreed on by a majority of the stockholders convened in general meeting: first, to strengthening and improving the works of the canal of every description requiring the same; next, to the accommodation, where not already provided, of the inhabitants of the shores of the river Potomac, and of the country drained by the tributary streams thereof, now navigable, or which may hereafter become so, by affording to them, in the best practicable mode, a safe and easy access to the canal, from the surface of the main river, and of the said streams emptying therein; and, last of all, to the erection of such walls of stone or other materials, along the water margin of the canal, as shall fit the same for the navigation of steam boats of a size adapted to the said canal. And should the said tolls continue, after all such improvements have been completed, to nett more than fifteen per cent. per annum to the stockholders for any two years in succession, the tolls upon the same shall be reduced, by the president and directors according to some just and equitable ratio, till the said dividend shal fall to fifteen per cent. per annum: *Provided*, That, should the said dividend thereafter sink below fifteen per cent. the said tolls, or a part thereof, may be renewed, till the said nett dividend reaches that

amount. And for any, or all the within-mentioned purposes, the said president and directors are empowered to borrow, in behalf of the company, on the credit of such excess of the tolls, such sum or sums of money, as they may deem expedient, at such rate of interest, and with such delay of payment, as they may stipulate, with the previous consent of a majority of the stockholders in general meeting convened.

12. *And be it further enacted,* That it shall be the duty of the president and directors of the Chesapeake and Ohio Canal Company, so long as there shall be and remain any creditor of the Potomac Company, who shall not have vested his demand against the same in the stock of the Chesapeake and Ohio Canal Company, to pay to such creditor or creditors annually, such dividend, or proportion of the nett amount of the revenues of the Potomac Company, on an average of the last five years preceding the organization of the said proposed company, as the demand of the said creditor or creditors at this time, may bear to the whole debt of one hundred and seventy-five thousand eight hundred dollars.

13. *And be it further enacted,* That, whenever the Potomac Company shall have declared its assent to the provisions of this act, in the manner hereinbefore provided, it shall be lawful for the said company to surrender its charter, and convey, in due form of law, to the Chesapeake and Ohio Canal Company, hereby incorporated, all the property, rights, and privileges, by them owned, possessed, and enjoyed, under the same; and thereupon it shall be lawful to and for the said company, hereby proposed to be created, to accept such surrender and transfer, and to hold, possess, use, and occupy, all the said property, rights, and privileges, in the same manner, and to the same effect, as the said Potomac Company now hold, possess, and occupy the same by law; and thereupon the charter of the said Potomac Company shall be, and the same is hereby, vacated and annulled, and all the rights and powers thereby granted to the Potomac Company shall be vested in the company hereby incorporated; and it shall be the duty of the said last mentioned company, until every section of the contemplated canal shall be completed, so as to be used and enjoyed for the purposes of navigation, to keep the corresponding part of the river in a proper state for navigation, and in good order as the same now is, and in default thereof, they shall be in all things responsible, in the same manner as the Potomac Company is now responsible. And in all rivulets, streams, creeks, and rivers, required for the Western section of the said Chesapeake and Ohio Canal, the same rights shall be, and are hereby, vested in the Chesapeake and Ohio Canal Company by this act, as the charter of the Potomac Company vested in the said company in relation to the waters of the Potomac and the tributary streams thereof.

14. *And be it enacted,* That the said canal, and the works to be erected thereon in virtue of this act, when completed, shall forever thereafter be esteemed, and taken to be navigable as a public highway, free for the transportation of all goods, commodities, and pro-

duce whatever, on payment of the tolls to be imposed, as provided by this act; and no other toll or tax whatever, for the use of the said canal and the works thereon erected, shall, at any time hereafter, be imposed, but by consent of the said States and of the United States.

15. And whereas it is necessary for the making of the said canal, locks, dams, ponds, feeders, and other works, that a provision should be made for condemning a quantity of land for the purpose: *Be it enacted*, that it shall and may be lawful for the said president and directors, or a majority of them, to agree with the owners of any land, through which the said canal is intended to pass, for the purchase or use and occupation thereof; and in case of disagreement, or in case the owner thereof shall be a femme covert, under age, non compos, or out of the State or county, on application to a justice of the county in which such land shall be, the said justice of the peace shall issue his warrant, under his hand, to the sheriff of the county, to summon a jury of eighteen inhabitants of his county, not related to the parties, nor in any manner interested, to meet on the land to be valued at a day to be expressed in the warrant, not less than ten, nor more than twenty days thereafter; and the sheriff, upon receiving the said warrant, shall forthwith summon the said jury, and, when met, shall administer an oath or affirmation to every juryman who shall appear, being not less than twelve in number, that he will faithfully, justly, and impartially, value the land, and all damages the owner thereof shall sustain by cutting the canal through such land, or the partial or temporary appropriation, use, or occupation, of such land, according to the best of his skill and judgment, and that in such valuation he will not spare any person for favor or affection, nor any person grieve for malice, hatred, or ill-will; and in every such valuation and assessment of damages, the jury shall be, and they are hereby instructed to consider, in determining and fixing the amount thereof, the actual benefit which will accrue to the owner from conducting the said canal through, or erecting any of the said works upon his land, and to regulate their verdict thereby; except that no assessment shall require any such owner to pay, or contribute any thing to the said company where such benefit shall exceed, in the estimate of the jury, the value and damages ascertained as aforesaid; and the inquisition thereupon taken, shall be signed by the sheriff and some twelve or more of the jury, and returned by the sheriff to the clerk or prothonotary of his county, and unless good cause be shown against the said inquisition, it shall be affirmed by the court and recorded; but if the said inquisition should be set aside, or if from any cause no inquisition shall be returned to said court within a reasonable time, the said court may, at its discretion, as often as may be necessary, direct another inquisition to be taken in the manner above prescribed; and, upon every such valuation, the jury is hereby directed to describe and ascertain the bounds of the land by them valued, and the quality and duration of the interest and estate in the same, required by the said company for its use; and their valuation shall be conclusive on all persons, and shall be paid for by the said president and directors to the own-

er of the land or his legal representatives; and on payment thereof, the said company shall be seized of such land as of an absolute estate in perpetuity, or with such less quantity and duration of interest or estate in the same, or subject to such partial or temporary appropriation, use, or occupation, as shall be required and described, as aforesaid, as if conveyed by the owner to them. And whenever, in the construction of the said canal, or any of the works thereof, locks, dams, ponds, feeders, tunnels, aqueducts, culverts, bridges, or works of any other description whatsoever, appurtenant thereto, it shall be necessary to use earth, timber, stone, or gravel, or any other material to be found on any of the lands adjacent or near thereto, and the said president and directors, or their agent, cannot procure the same for the works aforesaid by private contract of the proprietor or owner, or in case the owner should be a femme covert, or non compos, or under age, or out of the State or county, the same proceedings in all respects shall be had as in the case before mentioned of the assessment and condemnation of the lands required for the said canal, or the works appurtenant thereto.

16. *And be it enacted,* That it shall be the duty of the company hereby incorporated, to cut, make, and construct the said canal, with good and sufficient locks, on the most improved plan for expedition in the use thereof, and with a width of not less than forty feet at the surface of the water therein, or of twenty-eight feet at the bottom thereof, unless the quality of the soil shall require a narrow base to admit of a sufficient slope to preserve the banks from sliding down, and sufficient to admit, at all seasons, the navigation of boats and rafts, with a depth of four feet water at the least; and wherever wastes shall be essential to the security of the said canal, and in no other situation whatever, along the same, the waste water of the said canal may be, from time to time, sold or disposed of by the said company, for the purpose of supplying such works and machinery as require a water power. And along one side at least of the said canal, and such aqueducts as it may render necessary, there shall be provided throughout its whole extent, a towing path of sufficient breadth to apply the power of horses to the navigation thereof.

17. *And be it enacted,* That it shall and may be lawful for any of the said stockholders to transfer his or her shares, by deed executed before two witnesses, and registered, after the proof of the execution thereof, in the company's books, and not otherwise, except by devise, which devise shall also be exhibited to the president and directors, and registered in the company's books before the devisee or devisees shall be entitled to draw any part of the profits from the said tolls or dividends: *Provided,* That no transfer shall be made, except for one or more whole share or shares, and not for part of such share or shares; and that no share or shares shall, at any time, be sold, conveyed, or held in trust for the use and benefit, or in the name of another, whereby the said president and directors, or the stockholders of the said company, or any of them, shall or may be challenged, or made to answer concerning any such trust, but that every person ap-

pearing as aforesaid to be a stockholder, shall, as to the others of the said company, be, to every intent, taken absolutely as such; but as between any trustee and the person for whose benefit any trust shall be created, the common remedy may be pursued.

18. *And be it enacted*, That if the said capital, and the other aids already granted by this act, shall prove insufficient, it shall and may be lawful for the said company, from time to time, to increase the said capital by the addition of so many whole shares as shall be judged necessary by the said stockholders, or a majority of them, present at any general meeting of the said company; and the said president and directors, or a majority of them, are hereby empowered and required, after giving at least two months previous notice thereof, in at least four of the newspapers printed in Virginia, Pennsylvania, Maryland, and the District of Columbia, to open books in the beforementioned States and District, for receiving and entering such additional subscriptions, in which the stockholders of the said company for the time being, shall, and are hereby declared to have the preference of all others, for the first thirty days after the said books shall be opened as aforesaid, of taking and subscribing for so many whole shares, as any of them shall choose; and the said president and directors are hereby required to observe, in all other respects, the same rules therein, as are by this act prescribed for receiving and adjusting the first subscriptions, and in like manner to return, under the hands of any three or more of them, an exact list of such additional subscriptions, with the sums subscribed, to the public authorities, as aforesaid, to be, by them, preserved as aforesaid; and all stockholders of such additional shares shall, and are hereby declared to be, from thenceforward, incorporated into the said company.

19. *And be it enacted*, That, whenever it shall become necessary to subject the lands of any individual to the purposes provided for in this act, and their consent cannot be obtained, it shall and may be lawful for the company to enter upon such lands, and proceed to the execution of such works, as may be requisite; and that the pendency of any proceedings in any suit in the nature of a writ of ad quod damnum, or any other proceedings, shall not hinder or delay the progress of the work; and it shall be the duty of every court to give precedence to controversies which may arise between the company created by this act, and the proprietors of land sought to be condemned for public uses, and to determine them in preference to all other causes.

20. *And be it enacted*, That the said canal shall be, and the same is hereby, divided into two sections, to be denominated first and second, or eastern and western, respectively; that the first, or eastern section, shall begin at the District of Columbia, on tide water, and terminate at or near the bank of Savage river, or creek, which empties into the North branch of the Potomac, at the base of the Alleghany mountain; that the second, or western section, shall commence at the said termination, and extend along the valley of Savage river, or creek, so far as the same, or any branch thereof, as may reach some convenient

point thereon, for connecting the eastern and western waters, by a tunnel through, or an open cut across the dividing ridge between the same; and thence, after crossing the said dividing ridge, shall proceed to the highest steam boat navigation of the Ohio river, or of some one tributary stream thereof, in such direction as, in the opinion of the said president and directors, shall be best calculated for the attainment of the end set forth in the preamble of this act: that the said president and directors shall first construct the eastern section aforesaid, out of the capital stock hereinbefore mentioned, and shall next proceed to construct, with all possible despatch, the Western section thereof. In case the said company shall not begin the said work within two years after the company shall have been formed, or if the work, having been so begun, shall not be diligently prosecuted, so that one hundred miles of the said canal, with the adequate locks and incidental improvements, shall not be completed, and in fit order for navigation, in the term of five years from the commencement of the work, then all interest of the said company, in the navigation and tolls, shall cease and determine, and their charter shall be thereafter taken to be null and void; and so, in like manner, shall the said charter be null and void, if the entire eastern section be not completed in the term of twelve years from the said commencement. And should the said company fail to begin the western section of the said canal, in two years after the time allowed as aforesaid for the completion of the eastern section; or, having begun the western section, shall fail to complete the same in six years after such beginning, then all right, title, and interest, of the said company, in the said western section, shall cease and determine; and the several States aforesaid shall have full authority to incorporate another company for the completion of such section, or to complete the same in any other mode that they may deem expedient. And if, after the completion of the said canal and locks, the president and directors shall fail to keep the same in repair for twelve months at any time, then, in like manner, the interest of the company in the navigation and tolls shall cease, and their charter shall be forfeited.

21. *And be it further enacted*, That the right to the waters of the river Potomac, for the purpose of any lateral canal or canals, which the State of Virginia or Maryland may authorize to be made in connection with the said canal, is reserved to the said States respectively; that a similar right is reserved to the State of Pennsylvania, in relation to the rivers and streams within the territory of that State, the waters of which may be used in supplying the western section of the said canal; that the Government of the United States shall retain the power to extend the said canal in or through the District of Columbia, on either or both sides of the river Potomac: *Provided*, That, before this act shall take effect, the Congress of the United States shall authorize the States of Virginia and Maryland, or either of them, to take and continue a canal from any point of the above named canal, or the termination thereof, through the territory of the District of Columbia, or any part thereof, to the territory of the said States, or

either of them, in any direction they may deem proper, upon the same terms and conditions, and with all the rights, privileges, and powers, of every kind whatsoever, that the company incorporated by this act have to make the Chesapeake and Ohio canal. *And provided, also,* That, in taking or extending such lateral canal or canals through the District of Columbia, by either of the said States, no impediment or injury be done to the navigation of the said Chesapeake and Ohio canal.

22. This act, or so much thereof as respects the canal and works designed to be constructed in the District of Columbia, and the States of Virginia and Maryland, shall take effect, with such necessary modification in the construction thereof, as shall fit it for such limited application or use, upon the assent of the Congress of the United States, and the Legislature of Maryland being given thereto; and upon its receiving the further assent of the Legislature of Pennsylvania, the whole and every section and part thereof shall be valid and in full force and operation.

23. *Be it further enacted,* That the assent of the Congress of the United States, required by the first section of this act, and the authority conferred by the fourteenth section, is understood and taken, to relate only to their authority as the Legislature of the District of Columbia.

24. *Be it further enacted,* That all acts and parts of acts coming within the purview of this act, shall be, and the same are hereby, repealed.

RICHMOND, *Dec.* 30*th*, 1824.

The foregoing is a true copy of an Act of the General Assembly of Virginia.

WM. MUNFORD, *Keeper of the Rolls.*

NOTE 5.

ACT OF THE STATE OF MARYLAND.

AN ACT to confirm an act of the General Assembly of the State of Virginia, entitled "An act incorporating the Chesapeake and Ohio Canal Company."

Whereas the General Assembly of Virginia have heretofore, at the December session of the said General Assembly, in the year eighteen hundred and twenty-three, passed an act, entitled "An act incorporating the Chesapeake and Ohio Canal Company," in the substance, or words following:

[*See the preceding act.*]

Therefore, be it enacted by the General Assembly of Maryland, That the said act of the General Assembly of Virginia be, and the same is hereby, accepted, assented to, and confirmed.

And be it further enacted and declared, That, by confirming and accepting the act of Virginia, it is not intended by the Legislature of Maryland to deny to the Congress of the United States the constitutional power to legislate on the subjects of roads and canals. And for the purpose of removing all doubt as to the right of the State of Maryland to intersect the said Chesapeake and Ohio Canal, for the purpose of conducting a lateral canal or canals to Baltimore, or elsewhere in the State of Maryland, from that part of the said Chesapeake and Ohio Canal which shall be within the District of Columbia—

Be it further enacted and declared, That the said act of Virginia has been accepted and confirmed by the Legislature of Maryland, on the express condition that the act of Congress contemplated by the twenty-first section of the Virginia act, shall direct and provide some safe and practicable mode whereby such lateral canal or canals may be secured to the State of Maryland, and whereby, also, it may be determined whether such lateral canal or canals will injure the said Chesapeake and Ohio Canal, within the meaning and intention of the said twenty-first section of the Virginia act.

We hereby certify, that the foregoing is a true copy of the original act, as passed both branches of the Legislature, at December session, eighteen hundred and twenty-four.

WM. KILTY, *Clk. Senate of Md.*
JOHN BREWER, *Clk. House Del.*

Annapolis, Jan. 31, 1825.

Extracts from the Act of the State of Maryland, for the promotion of Internal Improvement, passed March 8, 1826.

"SEC. 19. *And be it enacted,* That the Treasurer of the Western Shore be, and he is hereby, authorized and required, for and on behalf of the State, to subscribe to the Chesapeake and Ohio Canal Company for stock to the whole amount of the stock of the Potomac Company owned by the State, and of the debt due to the State by the said Potomac Company, and to pay for the same in the certificates of the stock of the Potomac Company, and in the evidences of the debt due to the State, certified in the manner specified in the charter of the said Chesapeake and Ohio Canal Company; and also to subscribe for five thousand shares of the stock of the said company, payable agreeably to the terms of the charter in the legal currency of the United States.

SEC. 20. *And be it enacted.* That the Treasurer of the Western Shore be, and he is hereby, instructed and required, in like manner, to subscribe for five thousand shares in the Maryland Canal Company hereby incorporated.

SEC. 21. *And be it enacted.* That the sum of two hundred thousand dollars shall be, and the same is hereby, appropriated, or such part

thereof as may be necessary to drain, embank, and render dry and arable, the low lands on the margins of such rivers and creeks of the Eastern Shore of this State as the Board of Public Works may think proper and recommend, and to complete and carry into effect such plans for opening and improving the navigation of the Pokomoke, Manokin, Wicomico, Great Choptank, Chester, Elk, and North East Rivers, as the Board of Public Works may devise, recommend, and contract for on behalf of the State of Maryland: *Provided*, That, before any part of the aforesaid subscriptions, except so much as is payable in the stock and debt of the Potomac Company, shall be made, or any part of the sum herein appropriated to execute the improvements contemplated by this act to be made, on the low lands situated on the margins of the aforesaid rivers and creeks, or to execute the improvements of the Pocomoke, Manokin, Wicomico, Great Choptank, Chester, Elk, and North East Rivers be expended, the Congress of the United States shall, by law, authorize a subscription for not less than ten thousand shares of the capital stock of the eastern section of the Chesapeake and Ohio Canal, and shall enact a law expressly securing to the State of Maryland, and to any company incorporated, or hereafter to be incorporated by the said State, the right to take and continue a canal from any point of the Chesapeake and Ohio Canal through the Territory of Columbia, or any part thereof, to the said State, in any direction it may deem proper, upon the same terms and conditions, and with all the rights, privileges, and powers, of every kind whatsoever granted to the Chesapeake and Ohio Canal Company by the act of incorporation, and deciding agreeably to the act of Congress passed at December session, eighteen hundred and twenty-four, that the canal, as located by the Board of Public Works under the authority of this act, may be cut without impeding or injuring the navigation of the Chesapeake and Ohio Canal. *And provided also*, That the Board of Public Works shall previously ascertain and certify to the Executive the practicability of connecting, by the canal described in this act, the Chesapeake and Ohio Canal with the Patapsco River at the city of Baltimore; and if the said Board of Public Works shall adopt for the said canal a line wholly within the State of Maryland, then the act of Congress last mentioned in the foregoing proviso, shall not be necessary to authorize the subscriptions and expenditures aforesaid: *And provided also*, That the Executive shall previously be satisfied that the residue of the sum of money estimated by the United States Board of Engineers to be adequate to the completion of the Eastern section of the Chesapeake and Ohio Canal, after deducting the amount of the subscriptions of the State of Maryland and of the United States herein provided to be made, hath been actually subscribed by bona fide and competent subscribers."

An act to amend the "Act incorporating the Chesapeake and Ohio Canal Company."

SEC. 1. *Be it enacted by the General Assembly of Maryland,* That the act, entitled "An act incorporating the Chesapeake and Ohio Canal Company, passed by the General Assembly of Virginia, at the December session, eighteen hundred and twenty-three," which has already received the assent of the State of Maryland, and of the Congress of the United States, as well as of the Potomac Company, shall be, and the same is hereby, amended, in the manner hereinafter provided, on condition that this act receive, in like manner, the assent of the necessary parties thereto.

SEC. 2. *And be it further enacted,* That the Chesapeake and Ohio Canal Company shall have power to terminate the Eastern Section of the said canal, at or near the town of Cumberland, on the river Potomac, and thence, to extend the Western Section thereof, in any direction that may be deemed expedient, by any other route, as well as that prescribed in the act aforesaid, towards Pittsburg, on the river Ohio; and, in extending the same in any direction across the dividing ridge which separates the Eastern and Western waters, to substitute for a tunnel, and numerous locks, on such part of the route, inclined planes and railways, or any other artificial communication or roads; and, in the event that the Western Section of the Chesapeake and Ohio Canal shall leave the valley of the Potomac river at any point below the Coal Banks, at or near the mouth of Savage, on the North Branch thereof, the Company shall have the power, in like manner, to extend a branch from the main canal, to the said Coal Banks, at or above the mouth of Savage, and to cause such branch to be constructed, of such dimensions as their views of their own and the public interest may warrant; and, for the construction of the same, shall have and enjoy the same rights, privileges, and immunities, under the same restraints and conditions, in all respects, as they are entitled to in relation to the main Chesapeake and Ohio Canal.

SEC. 3. *And be it further enacted,* That nothing in this act contained shall be held to discharge the said Company from a compliance with each and every of the conditions of the original act, except so far as the same are expressly altered by the provisions of this act.

SEC. 4. *And be it further enacted,* That this act shall commence and be in force as soon as it shall have received the assent of the Legislature of Virginia, of the Congress of the United States, and of the Potomac Company.

We certify the aforegoing is a true copy of the original act, passed the Legislature of Maryland, at their present session.

Witness our respective signatures, this sixth day of February, in the year of our Lord one thousand eight hundred and twenty-seven.

W. KILTY, *Clerk Senate.*

GIDEON PEARCE,

Clerk House of Delegates Md.

NOTE 6.

ACT OF THE CONGRESS OF THE UNITED STATES.

An act confirming an act of the Legislature of Virginia, entitled "An act incorporating the Chesapeake and Ohio Canal Company," and an act of the State of Maryland, confirming the same.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That the act of the Legislature of the State of Virginia, entitled "An act incorporating the Chesapeake and Ohio Canal Company," be, and the same is hereby, ratified and confirmed, so far as may be necessary for the purpose of enabling any company that may hereafter be formed by the authority of said act of incorporation, to carry into effect the provisions thereof, in the District of Columbia, within the exclusive jurisdiction of the United States, and no further.

SEC. 2. *And be it further enacted,* That, should the State of Virginia or Maryland desire, at any time, to avail itself of the right secured to it by the twenty first section of the act aforesaid, to take and continue a canal from any point of the Chesapeake and Ohio Canal, to any other point within the territory of the District of Columbia, or through the same, on application to the President of the United States, by the Executive of the State, the President is authorized and empowered to depute three skilful Commissioners of the United States' Corps of Engineers, to survey and examine so much of the route of such canal as may affect, in any manner, the navigation of the Chesapeake and Ohio Canal. The said Commissioners, or a majority of them, shall ascertain, as far as practicable, whether the canal proposed to be constructed by the State aforesaid, will injure or impede the navigation of the Chesapeake and Ohio Canal, and report to the President of the United States the facts and reasons on which they may ground their judgment thereupon; which report shall be submitted to the Congress of the United States at their session next ensuing the date thereof, for their decision thereon; and if Congress shall be of opinion that the said canal may be cut in the manner proposed as aforesaid, without impeding or injuring the navigation of the Chesapeake and Ohio Canal, the same shall be conclusive thereon.

H. CLAY,
Speaker of the House of Representatives.
JOHN GAILLARD,
President of the Senate, pro tempore.

WASHINGTON, *March* 3, 1825.—Approved:
JAMES MONROE.

NOTE 7.

PROCEEDINGS OF THE GENERAL MEETING OF THE POTOMAC COMPANY.

GEORGETOWN, D. C. 16*th May*, 1825.

At a special meeting of the stockholders of the Potomac Company, held this day at Semmes' Tavern, previous notice thereof having been given conformably to law—

The following resolutions were unanimously adopted :

That this meeting, having duly considered the act of the General Assembly of the State of Virginia, passed at the December session thereof, in the year 1823, entitled "An act incorporating the Chesapeake and Ohio Canal Company," and the acts of the General Assembly of Maryland, and of the Congress of the United States, confirming the same, and being willing and desirous that the charter shall be granted and confirmed to the said Chesapeake and Ohio Canal Company, do hereby declare the full and free assent of the Potomac Company, to the said act incorporating the said Chesapeake and Ohio Canal Company, and to all the provisions thereof.

That the President of the Potomac Company be, and he is hereby, required to deliver to the Executives of the States of Virginia, Maryland, and Pennsylvania, respectively, and to the Secretary of the Treasury of the United States, copies of the aforegoing declaration of assent and corporate act of the Potomac Company, as required by the 1st section of the Act of the General Assembly of Virginia, entitled "An act incorporating the Chesapeake and Ohio Canal Company."

That the President and Directors of the Potomac Company be, and they are hereby, authorized and required, in the name and behalf of this Company, whenever, agreeably to the terms and provisions of the aforesaid Act of Virginia, entitled "An act incorporating the Chesapeake and Ohio Canal Company," the subscribers therein mentioned and referred to, shall have become incorporated, to make a surrender of the Charter of the Potomac Company, to the said Chesapeake and Ohio Canal Company, and to convey in due form of law to the said Chesapeake and Ohio Canal Company, all the property, rights, and privileges, owned, possessed, and enjoyed, by the said Potomac Company, under their said charter, to be held, used, and occupied, by the said Chesapeake and Ohio Canal Company, in the same manner and to the same effect, as the said Potomac Company now hold, possess, and occupy the same by law. And it is hereby resolved and declared, that, upon the completion of the said surrender and conveyance by the said President and Directors, to be evidenced by deed or deeds, in the name of this Company, under the hands of the said President and Directors or a majority of them, and the corporate seal of this Company, the said charter shall be, and hereby is, effectually surrendered, and all the said property, rights, and privi-

leges, shall be, and hereby are, effectually conveyed to the said Chesapeake and Ohio Canal Company, according to the tenor and effect, true intent and meaning, of the said act and acts so incorporating the Chesapeake and Ohio Canal Company, as aforesaid.

In testimony whereof, the corporate act as the Potomac Company, &c.

OFFICE OF THE POTOMAC COMPANY,

Georgetown, 16*th May,* 1825.

I hereby certify the aforegoing to be a true and faithful extract from the records of the proceedings of the Potomac Company.

ROB'T BERNARD,

Treas. and Clk. Poto. Com.

Extracts from the Charter of the Potomac Company.

Granted November, 1784.

"Sec. 4. *And be it enacted,* That the said president and directors, so elected, and their successors, or a majority of them assembled, shall have full power and authority to agree with any person or persons, on behalf of the said Company, to cut such canals, and erect such locks, and perform such other works as they may judge necessary, for opening, improving, and extending the navigation of the said river, above tide water, to the highest part of the North Branch, to which navigation can be extended, and carrying on the same from place to place, and from time to time, and upon such terms, and in such manner, as they shall think fit; and out of the money arising from the subscriptions and the tolls, and other aids hereinafter given, to pay for the same; and to repair and keep in order the said canals, locks, and other works, necessary thereto.

Sec. 11. And whereas it is necessary for the making of the said canal locks, and other works, that a provision should be made for condemning a quantity of land for the purpose: *Be it enacted,* That it shall and may be lawful for the said president and directors, or a majority of them, to agree with the owners of any land through which the said canal is intended to pass, for the purchase thereof; and, in case of disagreement, or in case the owner thereof shall be a *femme covert,* under age, *non compos,* or out of the State, on application to any two justices of the county in which such land shall lie, the said justices shall issue their warrant, under their hands, to the sheriff of their county, to summon a jury of twenty-four inhabitants of their county, of property and reputation, not related to the parties, nor in any manner interested, to meet on the land to be valued, at a day to be expressed in the warrant, not less than ten, nor more than twenty days

thereafter; and the sheriff, upon receiving the said warrant, shall forthwith summon the said jury; and, when met, shall administer an oath, or affirmation, to every juryman that shall appear, that he will faithfully, justly, and impartially, value the land, (not exceeding, in any case, the width of two hundred feet,) and all damages the owner thereof shall sustain, by the cutting the canal through such land, according to the best of his skill and judgment; and that, in such valuation, he will not spare any person for favor or affection, nor any person grieve for hatred, malice, or ill will; and the inquisition thereupon taken shall be signed by the sheriff, and some twelve or more of the jury, and returned by the sheriff to the clerk of his county, to be by him recorded: And, upon every such valuation, the jury is hereby directed to describe and ascertain the bounds of the land by them valued, and their valuation shall be conclusive on all persons, and shall be paid by the said president and directors to the owner of the land, or his legal representative: and, on payment thereof, the said company shall be seized *in fee* of such land, as if conveyed by the owner to them and their successors by legal conveyance.

Sec. 12. *And be it enacted,* That the said president and directors, or a majority of them, are hereby authorized to agree with the proprietor, for the purchase of a quantity of land, at or near such of the place of receipt of tolls aforesaid, for the purpose of erecting necessary buildings; and in case of disagreement, or any of the disabilities aforesaid, or the proprietor being out of the State, then such land may be valued, condemned, and paid for as aforesaid, for the purpose aforesaid; and the said company shall, upon the payment of the valuation of the said land, be seized thereof *in fee simple,* as aforesaid.

Sec. 13. And whereas some of the places through which it may be necessary to conduct the said canals may be convenient for erecting mills, forges, or other water-works, and the persons, possessors of such situation, may design to improve the same; and it is the intention of this act not to interfere with private property, but for the purpose of improving and perfecting the said navigation—*Be it enacted,* That the water, or any part thereof, conveyed through any canal or cut made by the said company, shall not be used for any purpose but navigation, unless the consent of the proprietors of the land, through which the same shall be led, be first had."

NOTE 8.

ACT OF THE STATE OF PENNSYLVANIA.

An act incorporating the Chesapeake and Ohio Canal Company.

SECTION 1. *Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same,* That the full and entire assent of this Commonwealth be, and the same is hereby, given to all

and each of the provisions, mentioned and contained in an act of the Legislature of the State of Virginia, passed the twenty-seventh day of January, one thousand eight hundred and twenty-four, entitled "An act incorporating the Chesapeake and Ohio Canal Company," so far as the same are or may be applicable to this Commonwealth; and the said act of the State of Virginia is hereby adopted, ratified, and confirmed, and enacted into a law of this Commonwealth, and all and each of the provisions, conditions, and restrictions thereof, as fully and effectually, as if the same were enacted, paragraph by paragraph, and section by section, so far as the same can apply to this Commonwealth; always, nevertheless, subject to the exceptions, provisions, and restrictions, hereinafter mentioned; and the said act shall hereafter be in full force and effect, wherever the same is applicable, as well within, as without this Commonwealth, as an act incorporating the Chesapeake and Ohio Canal Company, for all and every of the objects and purposes therein set forth and provided for, according to the true intent and meaning of the said act of the State of Virginia: an exemplification whereof shall be annexed to this act, and be published in the same manner as the laws are usually published; and the Governor shall likewise cause an exemplified copy of the said act of Virginia to be deposited in the Secretary's office of this Commonwealth, and shall also transmit an attested copy of this act to the President of the United States, and one copy thereof to the Governor of Virginia, and one copy thereof to the Governor of Maryland.

Sec. 2. *And be it further enacted by the authority aforesaid,* That this act shall have no effect, unless, within three years from and after the passage hereof, the State of Maryland shall pass a law authorizing the State of Pennsylvania, or any company which may be for that purpose incorporated by the State of Pennsylvania, to take and continue a lateral canal or canals, or a rail way, from any point or points within the territory of Pennsylvania, to and connect with the Chesapeake and Ohio Canal, within the territory of the said State of Maryland, upon the same terms and conditions, and with all the rights, privileges, and powers, of every kind whatsoever, that the Chesapeake and Ohio Canal Company may have to make the said Chesapeake and Ohio Canal, and unless the said Chesapeake and Ohio Canal Company shall assent to and accept the said law of the State of Maryland, within one year after it shall have been enacted; *Provided,* That, should the said Chesapeake and Ohio Canal be located on the south side of the Potomac, at any point or points below the town of Hancock, then the assent of Virginia, and the said Chesapeake and Ohio Canal Company shall also be obtained in like manner, before this act goes into operation, except so far as it requires the assent of Maryland to the right to make a railway through the territory of that State.

Sec. 3. *And be it further enacted by the authority aforesaid,* That, as a condition on which this act shall pass, no greater tolls shall be charged or paid on goods, commodities, and produce, entering and transported on the said Chesapeake and Ohio Canal, from such lateral

canals, than are charged and paid on other goods, commodities, and produce of the same kind, transported on the said Chesapeake and Ohio Canal: *And provided further*, That the aforesaid Chesapeake and Ohio Canal Company shall extend the Chesapeake and Ohio Canal to, and terminate the same at, the city of Pittsburg.

SEC. 4. *And be it further enacted by the authority aforesaid*, That the said Chesapeake and Ohio Canal Company shall have full power and authority to alter and change the route of the western section of the said canal, so that the same may commence at the town of Cumberland, situated near the junction of Wills Creek, with the north branch of the Potomac, and be continued from thence by the valley of Wills creek, and Casselman's river, to the Youghiogeny, and from thence to the city of Pittsburg: *Provided*, That the United States' Board of Internal Improvement, or a majority thereof, should deem and report that route to be the best.

SEC. 5. *And be it further enacted by the authority aforesaid*, That, should the United States of America subscribe to the stock of the said Chesapeake and Ohio Canal Company, the said company shall, within six months after receiving the sum subscribed, commence the western section of said canal, at such point or points as may be deemed most advantageous to the interests of the said company; and it shall be their duty to apportion at least one half of the subscription of the United States to the western section of the said canal. And whatever amount of stock may be subscribed by the citizens of Pennsylvania, shall be expended wholly on the western section, unless authority is given to the said company, by the Pennsylvania subscribers, to expend their subscriptions differently; and in case of failure of the said company to comply with the provisions herein set forth, this act shall cease to have any force or effect whatever.

SEC. 6. *And be it further enacted by the authority aforesaid*, That, if the nett annual dividend of said company shall, for any two years in succession, exceed the amount of fifteen per cent. such excess shall be equally applied by the president and directors, to the accommodation of the inhabitants of the shores of the Youghiogeny and Monongahela rivers, and of the country drained by the tributary streams thereof, now navigable, or which may hereafter become so, in the same manner, in proportion to the distance, as is directed for the accommodation of the inhabitants of the shores of the Potomac, and its tributary streams, by the eleventh section of an act of the State of Virginia, entitled "An act incorporating the Ohio and Chesapeake Canal Company," passed the twenty-seventh day of January, one thousand eight hundred and twenty-four.

SEC. 7. *And be it further enacted by the authority aforesaid*, That it shall and may be lawful for the said Chesapeake and Ohio Canal Company, at any place within this Commonwealth, on the route of the said canal, to sell or lease the use of the water contained therein, or in any embankment, dyke, pond, or other improvement connected therewith, to any individual or individuals, or private company or companies for that purpose incorporated by the State of Pennsylvania, for mills, or any other water works, or for irrigating any lands, or

for supplying bleach grounds, tan pits, or brick yards, and the profits or rents resulting therefrom, to take and receive to, and for the use and benefit of, the said corporation, in addition to the tolls and profits allowed to be taken by the act of Virginia: *Provided*, That the navigation of the said canal be not thereby impeded or obstructed: *And provided further*, That the said Chesapeake and Ohio Canal Company shall not, at any time, be directly or indirectly engaged or concerned in any banking, merchandising, milling, or the erecting of mills, manufacturing or mining, or in any other business whatsoever, except such as may be necessary and proper for the construction of such canal and appurtanances, and the performance of the several functions of a canal company.

SEC. 8. *And be it further enacted by the authority aforesaid*, That, as a further condition on which the assent of this State is given to the Virginia act, aforesaid, that, so far as regards the territory of Pennsylvania, whenever the said canal shall cross any public or private laid out road or highway, or shall divide the ground of any person or persons, so as to require a ford or bridge to cross the same, the jury, who shall inquire of the damages to be sustained, in manner directed by the fifteenth section of the Virginia act, shall find and ascertain whether a passage across the same shall be admitted or maintained by a ford or bridge; and on such finding, the said Ohio and Chesapeake Canal Company shall cause a ford to be rendered practicable, or a bridge fit for the passage of carts and wagons to be built, and forever hereafter maintained and kept in repair, at all and every places so ascertained by the said jury, at the cost and charges of the said company; but nothing herein contained shall prevent any person from erecting and keeping in repair, any foot or other bridge, across the said canal, at his own expense, when the same shall pass through his ground: *Provided*, The same shall be of such height above the water, as shall be usual in the bridges erected by the company: *And provided also*, That such foot or other bridges, so to be erected by the owners of such lands, shall not interfere with any of the locks, buildings, or other works of the company, or with the navigation of the said canal.

SEC. 9. *And be it further enacted by the authority aforesaid*, That the assent of the Legislature of this Commonwealth, to the said act of the Legislature of Virginia, is given and granted, upon the further express conditions, that any mesne process which may be issued against the said company, may be served on any toll gatherer, director, or other officer, of the company; and such service shall be held good, valid, and effectual, as a service of such process upon the said Ohio and Chesapeake Canal Company; and that said company shall annually report to the Legislature of Pennsylvania the progress they may make in constructing the said canal; and also an annual abstract of their accounts, certified by the oath of the President of the said Company, shewing the amount of capital stock actually paid in, and the sums deposited with the Treasurer for contingent and current expenses, and the profits which may have accrued, and the dividends made or declared during the preceding year.

NOTE 9.

Extract from the Report of the United States Engineers of the 23d of October, 1826, communicated to the House of Representatives with the President's Message of the 7th of December, 1826.

"PLAN AND ESTIMATE OF THE CANAL.

The transverse section of the canal is exhibited on the sheet No. 3. The breadth at the bottom is 33 feet; at the surface 48 feet; the depth of water, 5 feet; the tow-path, 9 feet wide; the guard-banks, 5 feet at the top; the surf berms, kept on the level of water, 2 feet wide each; the tow-path, and top of the guard-bank, 2 feet above the surface of the canal.

This transverse section is to be modified where local circumstances require it; and, more especially, in the cases of deep cutting, steep side cutting, embanking, and, also, where the canal is supported by walls. In the framing of the plan, a due attention has been paid to these modifications, with a view to conciliate the convenience of the work with the strictest economy. The depth of five feet has been preserved throughout the line, but the breadth has been often much lessened. As to the surf berms, they are intended to protect the slopes from being washed off, as also to lessen the resistance opposed to the boat, by affording to the eddy water a free passage.

We must submit, however, the reasons which led us to propose the above dimensions.

The experiments made in 1775, by the French Academicians (D'Alembert, Condorcet, and Bossuet,) have shown: 1. That the resistance of water to the perpendicular motion of a given plane, may be regarded as proportional to the square of the velocity; 2. That, the velocity being the same, the resistance of water may be considered as proportional to the area of the plane; 3. That these results obtained only in the case of an indefinite expanse of water; 4. That, in narrow canals, the resistance increases in a more rapid ratio than the square of the velocity.

To attenuate, as much as practicable, this inconvenience, researches have been made to ascertain what should be the ratio between the transverse section of the canal and the transverse section of the boat, in order that the boat might move through such a canal, as through an indefinite expanse of water. Experiments made on the subject, by the celebrated Chevalier Dubuat, have shown that, to attain this result, the cross section of the canal ought to be, with moderate velocities, $6\frac{46}{100}$ times the cross section of the boat, and the water-line $4\frac{1}{2}$ times the breadth of the boat.

Adopting, to preserve uniformity, $13\frac{1}{2}$ feet for the breadth of the boats used on the Chesapeake and Ohio Canal, [which is the breadth of the Erie Canal and of the Ohio Canal boats;] if we suppose the draft to be three feet, the prow to be rectangular, and the sides and

bottom of the boat to conform to it, the cross section of the boat will be 40.5 square feet. Taking, now, this area $6\frac{46}{100}$ times, we find $261\frac{2}{3}$ square feet for the cross section of the canal, through which the boat would not meet with a greater resistance than through an indefinite expanse of water. The water line should be $60\frac{3}{4}$ feet, that is, four times and a half the breadth of the boat.

Were not expense to be taken into consideration, these dimensions might be recommended; but fitness of the work, and strict economy, must be reconciled as much as practicable; and it is in such a view that smaller dimensions are to be fixed upon.

It is to be remarked, that the distance from Georgetown to Pittsburg, in following the line of canal, is $341\frac{1}{2}$ miles, which, at the rate of $2\frac{1}{2}$ miles per hour, will be travelled in about - 136 hours.
The ascent and descent, amounting together to 3158 feet, will require, at the rate of 1 minute per foot, about 52

Distance, in time, from Georgetown to Pittsburg. 188 hours.

Though a number of canals, selected among those executed to this day, might afford together the distance and lockage found for the Chesapeake and Ohio Canal, yet there is not, within our knowledge, any line of the same extent requiring even 1800 feet of ascent and descent taken together: the Erie Canal requires 688 feet for 362 miles; the line from Liverpool to London, $1451\frac{1}{4}$ feet, for 264 miles; the canal from the Rhone to the Rhine, connecting Lyons with Strasbourg, has about 1458 feet of lockage for a length of 200 miles. The proposed canal has, therefore, as to time, a decided inferiority, when compared to a canal of the same length, but having a less amount of lockage; and it becomes, in the present case, indispensable to remedy this inconvenience. The means we propose consist in the increase of the dimensions of the cross section of the canal, with a view to compensate by a greater weight, [transported without additional power,] for the virtual increase of distance caused by so great an amount of lockage.

We have shown that this section ought to be 261 square feet, with a water line of 60 feet, to procure a boat 13 feet 6 inches in breadth the advantage of moving on the canal, as on an indefinite extent of water. After many trials and minute calculations we have concluded to adopt, for the contemplated canal, the $\frac{4}{5}$ths of the foregoing results, viz: for the cross section, 208 square feet; and for the water line, 48 feet: and from these data we have framed, with a depth of 5 feet, the general transverse profile of the canal, as exhibited on the sheet No. 3.

Let us now compare this profile to one having 40 feet at the surface, 28 feet at bottom, and 4 feet in depth—the boat used being the same for both, and having $13\frac{1}{2}$ feet in breadth, and 3 feet in draught.

We find, by calculations, that, the velocity remaining the same, the resistance to the boat moving in the 48 feet canal, is, to the resistance to the same boat moving in the 40 feet canal, as 1.21 to 1.58, or as 100 to 130. Therefore, at the same rate of velocity, 100 horses will, on the 48 feet canal, perform the same work as 130 horses on the 40 feet canal; and, with the same towing power, the weight transported

on the 48 feet canal, will be to the weight transported on the 40 feet canal, as 130 to 100.

But the depth of the 48 feet canal being one foot greater than the depth of the other, let us examine what will be the comparative resistance of the boat being immersed 4 feet into the 48 feet canal, and but 3 feet in the other. We find, in this case, the ratio to be 1.47 to 1.58, or 100 to 107; and we infer from it that, with a gain of about seven per cent. of towing power, the weight transported on the 48 feet canal will be one-third greater than the weight transported, during the same time, on the 40 feet canal.

The foregoing considerations show, that, in determining the transverse section of a canal of great length, and with a dividing summit level, the amount of lockage must have a due influence upon the breadth and depth of the water section. And, indeed, taking into view the great distance and considerable lockage belonging to the present case, a cross section, larger than that recommended, might have been suggested, had not a regard to economy, and to a competent supply of water during the dry season, forbidden it.

However, the transverse section, as just proposed, may be deemed sufficient to fulfil, in a satisfactory manner, the main requisite for which it has been intended. And, in order to remove all doubt, let us compare, as to amount of transportation, the contemplated Chesapeake and Ohio Canal with another of the same length, but whose lockage would be 600 feet only, with a transverse section of 40 feet at the surface, and 4 feet in depth.

The rate of travelling being supposed, for both, 2½ miles per hour, and one minute allowed for each foot of lockage, sixty feet will be, as to time, equivalent to 2½ miles, and these canals will then compare as follows:

The Chesapeake and Ohio Canal having 3,158 feet of lockage in a distance of 341½ miles, is equivalent, as to time, to a single level canal of 473 miles, which would require 189 hours to be travelled from one end to the other.

The 40 feet canal, having 600 feet of lockage in a distance of 341½ miles, is equivalent, as to time, to a single level canal of 367 miles, and which would be travelled in 146 hours from one end to the other. But it has been shown that, on the first canal, the amount of transportation being expressed by 130, it will be 100 on the 40 feet canal; the velocity and towing power remaining the same in both cases. Comparing, now, this ratio of 130 to 100, with that of the times employed to travel respectively each canal, viz: 189 hours to 146, it is found that these ratios are equal. Therefore, on either of these canals, and notwithstanding a difference of 2,558 feet lockage, an equal weight will be transported during the same time, and with an equal towing power; a result entirely due to a larger transverse section having been assigned to the canal whose lockage is greater."

Letter from Gen. Bernard to Hon. C. F. Mercer.

WASHINGTON CITY, *February* 17, 1827.

SIR: I have the honor to forward to you the result of the calculation you asked for in relation to a canal 60 feet wide at the water-line, 45 at the bottom, and 5 feet deep.

The cross section of the boat remaining as assumed in the report on the Chesapeake and Ohio Canal, such a boat would, for the reasons set forth in this report, move, at moderate velocities, on the 60 feet canal, as on an indefinite extent of water.

The resistance proved, in this case, by the boat being expressed by 1, the number 1.21 will represent the relative resistance in a 48 feet canal, and 1.58 that in a 40 feet canal. Thus, with a towing power of 100 horses, the same work will be performed on the 60 feet canal as with 121 horses on the 48 feet canal, and 158 on the 40 feet canal: these two latter canals being here supposed to retain the respective cross sections assigned to them in the aforesaid report.

Now, assigning to these two canals the same comparative length and amount of lockage as alluded to in the report, they become on the same footing as to towing power. But the 60 feet canal has the same length and amount of lockage as the 48 feet canal; therefore, it will have an advantage of 21, or 18 per cent. over the latter as to towing power, and the same advantage over the 40 feet canal. In other words, 18 per cent. more weight would be transported, during the same time and with the same towing power, on the 60 feet canal, than on the two others.

I have the honor to be, sir, very respectfully, your obedient servant,

BERNARD,
Brig. Gen.

To the Hon. C. F. MERCER, *M. C.*
Washington City.

NOTE 10.

Extract from Smith's Inquiry into the nature and causes of the Wealth of Nations, vol. 3, *chap.* 1, *p.* 96.

"In several parts of Europe, the toll or lock duty upon a canal is the property of private persons, whose private interest obliges them to keep up the canal. If it is not kept in tolerable order, the navigation necessarily ceases altogether, and along with it the whole profit which they can make by the tolls. If those tolls were put under the management of commissioners who had themselves no interest in them, they might be less attentive to the maintenance of the works which produced them.

The canal of Languedoc cost the King of France and the province, upwards of thirteen millions of livres, which amounted to upwards of nine hundred thousand pounds sterling. When that great work was

finished, the most likely method, it was found, of keeping it in constant repair was, to make a present of the tolls to Riguett, the Engineer, who planned and conducted the work."

P. 147. "When a navigable cut or canal has been once made, the management of it becomes quite simple and easy, and it is reducible to strict rule and method. Even the making of it is so, as it may be contracted for with undertakers, at so much a mile, and so much a lock.

Such undertakings, therefore, may be, and accordingly, frequently are, very successfully managed by Joint Stock Companies." "That navigable cuts and canals, are of great and general utility; while at the same time, they frequently require a greater expense than suits the fortunes of private people, is sufficiently obvious."

NOTE 11.

The Caledonian Canal, in Scotland, and a short cut of a few miles on the Thames are the only works of this description in Great Britain, which have been constructed by the immediate agency, and out of the resources, of the National Government, of all the numerous canals of that Island, amounting, in total length, to more than three thousand miles.

NOTE 12.

Extract from the Report of a Committee of the House of Delegates of Virginia, of the 28th of December, 1815, upon which the Virginia System of Internal Improvement and Board of Public Works were founded.

"It may be sound policy for the Commonwealth, in order to accomplish some great commercial or political purpose, to throw open to general use, without the charge of tolls, a particular canal or road; but, it can never be its interest, for many reasons, to become the sole proprietor of all the public works within its territory. Experience testifies that they will be more economically made, and better repaired, if their management be left to the individuals who subscribe to their stock with a view to private gain, than if confided to public officers or agents. The Commonwealth should subscribe so much to their stock, and on such terms as will suffice to elicit individual wealth for public improvement—and the control which she retains over the conduct of the individual subscribers, should extend no farther than to prevent or correct such abuses upon the community at large, as might be apprehended from the too eager incentive of gain.

By yielding to the individual subscribers the profit of the State on its shares of the stock of any company, where required to secure such individuals against temporary loss, a much smaller subscription of public money will suffice to draw forth private enterprise.

The Commonwealth can never be a loser, if a public work, judiciously begun, be finally perfected—and the public security against such loss, will be found in the discretion which the Legislature retains over the choice of the objects for which its patronage is sought.

As the market rate of interest decreases in every commercial country, with the growth of its capital, the maximum profit of the stock of each company may be reduced, after the lapse of a limited period of time.

The least profit allowed by law, should be great enough to create the hope of private advantage in those whose enterprise can have no other object; and that *minimum*, which the community have so much interest in reducing, may be safely fixed at a lower amount, in proportion as the magnitude and conditions of the public subscription afford to private adventurers, an indemnity against any ultimate loss."

The resolutions at the end of this report apply the preceding principles.

"8. *Resolved*, That the President and Board of Public Works, shall be authorized to subscribe, in behalf of the Commonwealth, to such public works as the General Assembly may, from time to time, agree to patronize, such portions of the Revenue of the Fund for Internal Improvement, as may be directed by law: but that no part of the fund shall be subscribed towards the stock of any Canal or Turnpike Company, until three-fifths, at least, of the whole stock, necessary to complete such Canal or Turnpike, shall have been otherwise subscribed, nor until, of the stock so subscribed, one-fifth part shall have been paid in by the respective subscribers, or the payment thereof effectually secured.

9. That the dividends upon the stock which may be subscribed by the President and Board of Public Works, shall go exclusively to other subscribers than the said President and Board, until such portion of the stock of those subscribers, shall have nett to them six per centum per annum, from the specified time of such payment. That any increase of profit, after that nett income has been assured to those subscribers, shall belong exclusively to the Fund for Internal Improvement, until the nett annual income of the whole stock actually expended by any company shall reach six per centum per annum, after which, the President and Board of Public Works and the other subscribers to the Stock of the Company, shall divide the nett profits on such stock, in proportion to their respective interests.

10. That, whenever the nett income of any Company shall be found for two succeeding years, or upon an average of five succeeding years, to surpass fifteen per cent. per annum, the General Assembly may reduce the tolls from which such income is derived, so as to limit the nett revenue of the Company to that amount: *Provided*,

that, should the tolls for any two succeeding years fail to yield a nett income to the Company of ten per cent. per annum, the President and Board of Public Works, on satisfactory evidence being adduced thereof, may authorize the tolls to be augmented so as to assure to the Company such nett income: *And provided also*, that, after the lapse of sixty years, the maximum profit of the Company may be reduced to twelve per cent; and after the lapse of one hundred years, to ten per cent. per annum.

11. That the President and Board of Public Works, shall have power to vest in any productive fund, the unappropriated dividends accruing upon any of the stock committed to their charge, until the same shall be specially applied, by law, to some object of internal improvement; that they may, from time to time, subject to the control of the General Assembly, sell the whole or any part of the shares held by the Commonwealth in the stock of any Canal or Turnpike Company, for the purpose of reinvesting the proceeds of sale in the stock of some other similar public work.

12. That the President and Board of Public Works shall have power to appoint, in behalf of the Commonwealth, so many directors of every public work, as shall bear to the whole number of directors, of such work, the proportion of the Commonwealth's shares of stock in such work, to the whole number of shares subscribed thereto.

13. That it shall be the duty of the President and Board of Public Works to keep a fair and accurate record of all their proceedings, to be at all times open to the inspection of the members of the General Assembly, and of the President, Directors, and other officers of any company interested therein; that they shall report to the General Assembly at, or near the commencement of every annual session, the exact state of the funds for Internal Improvement, the progress and condition, noting, especially, the nett income of all the public works within the Commonwealth, the surveys, plans, and estimated expense of such new works, as they may recommend to the patronage of the General Assembly, together with all other important imformation, which it may be in their power to collect, relative to the objects committed to their trust.

14. And lastly, *Resolved*, That the appropriations contained in these resolutions shall continue in force, until the first day of January, 1900, except, at such times as the United States of America may be involved in war, when the Legislature may withdraw, during the period of actual hostilities, the whole or any part of the said fund, for the purpose of defence, provided such withdrawal can be made without a breach of public faith."

The preceding resolutions, which had been submitted to the General Assembly of Virginia, with many others relating to the same topic, as early as the 15th of December, 1812, were, on the 5th of February, 1816, made the basis of a law of that Commonwealth, still in force.

A bill has recently passed the Legislature of the State of New York to aid the Delaware and Hudson Canal Company by a loan of credit to the amount of $500,000.

Note 13.

Extract from a Report of the United States' Board of Internal Improvement, of the 23d of October, 1826, *transmitted to the House of Representatives, December 7,* 1826.

"We should here remark that the Union owns, in the States of Ohio, Indiana, Illinois, and the Michigan Territory, 59,998,000 acres of land, *to which the Indian title is extinguished,* besides 18,946,000 acres not yet ceded: valuing the first at two dollars per acre, we have $119,996,000; and supposing only ten per cent for the augmentation of value they will receive, we find the Union, as landholder, will gain about $12,000,000 by the opening of the canal: to which should be added the land owned by the Government in the District of Columbia."

A prior report of the Committee of the House of Representatives on the District of Columbia, of the 3d of May, 1822, refers to this subject in the following terms:

"With an almost boundless authority over the District of Columbia, the Government of the United States acquired new, urgent, and daily increasing interests in the navigation of the Potomac.

"In the rapid improvement, and consequent security of the seat of the Federal Government from foreign danger, are involved, not only the preservation of the property and lives of its inhabitants, the accommodation and comfort of its numerous public functionaries, but, in no small degree, the national character and honor. The most deplorable calamity of the late war would, doubtless, have been averted, had the Capital of the United States been encompassed by the dense population of a large city, by such a population as would unquestionably succeed the contemplated improvement of the navigation of the Potomac. And, if sordid views may be allowed to mingle with considerations of such inestimable consequence, it may be added that, with the growth of the numbers and opulence of a great commercial emporium, would of necessity arise a corresponding appreciation of the value of all the disposable public lands in the city of Washington, consisting of more than 5,000 vacant lots, and now computed at near 2,000,000 dollars, it is not unreasonable to suppose, that their value would be quadrupled, by a prospect of their early occupation and improvement."

Note 14.

See the letter of General Bernard, in Note 9, and the preceding extracts from the report of the Board of United States' Engineers.

NOTE 15.

The United States' Board of Internal Improvement have estimated the cost of the Chesapeake and Ohio Canal at $22,375,427 69 cents, and in that estimate have distributed the entire canal into three sections, denominated respectively Eastern, Middle, and Western. The Eastern begins at Georgetown and ends at Cumberland; the Middle begins at Cumberland and ends at the mouth of Casselman's river, on the Youghiogeny; the Western extends from thence to Pittsburg. The following table expresses the respective distances, elevation or descent, lockage, and computed cost of these sections:

	Distance.		Ascent & Descent.	Number of Locks.	Amount of the Estimate.
	Miles.	Yds.	Feet.		
Eastern Section,	185	1078	578	74	$8,177,081 05
Middle Section,	70	1010	1961	246	10,028,122 86
Western Section,	85	348	619	78	4,170,223 78
	341	676	3158	398	22,375,427 69

This estimate the recent Convention, of Delegates from several States, assembled in Washington, embracing many men of much practical knowledge, and several experienced Engineers, unanimously concurred in reducing below one half of its entire amount. The Convention were guided in this reduction chiefly by the actual contract prices of work done upon other canals within the United States, either already constructed, or in progress, and especially on the contracts for those of the State of Ohio and Pennsylvania, which are made at public expense. The similitude of that part of the Chesapeake and Ohio Canal, which will ascend the Monongahela from Pittsburg to the canal already extended from that city up the Alleghany river, and of the contemplated canal along the Potomac, to that in part constructed along the Susquehanna, furnishes a solid ground on which to rest this standard of prices. Tried by this standard, the estimate of the United States' Board exceeds the probable cost of the Chesapeake and Ohio canal twelve millions of dollars. It is believed, therefore, that the Eastern section of the Chesapeake and Ohio canal may be extended to the coal banks of the Alleghany, on the enlarged plan recommended by the bill accompanying this report, for less than five millions of dollars; and that, for six millions more, the entire canal to Pittsburg, including its tunnel, may be completed. The committee having founded this belief on the reports of certain committees of the late Washington Convention, for the satisfaction of the House of Representatives they include those reports in this appendix. Their results were also confirmed by the information of their own body, a member of which was for some time a contractor upon the Erie Canal of New York.

Report of the Central Committee of the Chesapeake and Ohio Canal Convention. December 6th, 1826.

The Committee, acting under a resolution of the Convention of Delegates from certain counties and corporations of the States of Virginia, Maryland, Pennsylvania, Ohio, and the District of Columbia, which assembled, pursuant to a public invitation and notice, in the Capitol of the United States, on the 6th day of November, 1823, have presumed to request a re-assemblage of that Convention, under the authority vested in them, of "consulting upon, and adopting, in "behalf of the Chesapeake and Ohio Canal, such measures as may "seem best calculated to assure its certain and speedy completion;" and now submit to the Convention the following report:

That, as soon as practicable after the adjournment of the Convention, on the 8th of November, 1823, they entered on the performance of the several duties specifically devolved on them by the resolutions adopted by the Convention on that day.

Memorials were promptly prepared by the Special Committees of Maryland and Virginia; and, being submitted to this Committee, and approved by them, were presented, on behalf of the Convention, to the Legislatures of those States respectively.

To avoid delay, the Committee appointed to prepare the memorial designed for the Legislature of Pennsylvania, was requested to forward it directly to Harrisburg, from the residence of its Chairman.

Before a memorial was addressed to the Legislature of Ohio, to suggest the expediency of causing the line of a canal to be surveyed, extending from the Ohio river, by means of the waters of Big Beaver and Cuyahoga River, to the Southern shore of Lake Erie, the Committee appointed for that purpose were apprised that the recommendation from the President of the United States, in his Address to both Houses of Congress, would probably lead to its more prompt execution by the United States' Engineers. In accordance with the decision of the Convention, the act of the Legislature of Virginia, of the 22d of February, 1823, incorporating the "Potomac Canal Company," was assumed as the basis of the charter of the Chesapeake and Ohio Canal Company, and the modifications of that act, required by the resolutions of the Convention, together with such others as were deemed expedient by the Committee, were superadded to its provisions, in a bill, copies of which were cotemporaneously forwarded to Richmond and Annapolis, before the expiration of the year 1823. A correspondence was, at the same time, instituted between the Committee and the active friends of the Chesapeake and Ohio Canal, in the several Legislatures of Virginia, Maryland, and Pennsylvania.

In the last, it was deemed expedient to await the agreement of Maryland and Virginia, on the terms of any charter which should have the effect of superseding that of 1784, granted by those States to the existing "Potomac Company," and the formal acquiescence of that Company in such an agreement.

Any application to Congress, in behalf of the District of Columbia;

through which the new Canal would be required to pass, was also delayed for the same reason.

The assent of any other party to the terms of the proposed charter, before the concurrence in its favor of the two States most deeply interested in it, might, it was apprehended, retard its progress towards maturity, by opposing a new obstacle to such modifications of its numerous details, as either of these States might be inclined to insist upon as a condition of its ratification.

On the 27th of January, 1824, the bill which had followed the memorial of the Convention to Richmond, received the sanction of the General Assembly of Virginia, though not before it had been amended, on the suggestion of the friends of the common enterprise in the Legislature of Maryland, through the Central Committee, in such manner as was deemed by them best calculated to remove every legal impediment to the future union of the waters of the Patapsco with the Chesapeake and Ohio Canal; nor, until it had been accompanied by a formal declaration, on the part of the Legislature of Virginia, that the act, which she had approved, and to which the assent of the United States was invited, should not be construed into an admission, on her part, of the much contested power of the Federal Government to institute a System of Internal Improvement.

The first of these amendments, from the manner in which it modified the section in which it was inserted, afforded the strongest evidence of the disposition of the Central Committee, and of the advocates of the Chesapeake and Ohio Canal in the Legislature of Virginia, to accommodate their friends in Annapolis.

As soon as it was known, however, that the General Assembly of Maryland had risen, without concurring in the new charter, an abortive effort was made to obtain for it the sanction of Pennsylvania, in the hope, entertained by the Committee, that the accession of that State to the terms of the charter, would occasion a more propitious result, at Annapolis, the ensuing Winter. It was also designed to ground upon the co-operation of Pennsylvania with Virginia, an application to Congress, during its still depending Session, for a confirmation of the joint act of those States, with a view to the same end.

The failure of the first effort involved that of both.

It was not until the 31st of January, 1825, or near the close of their ensuing session, that the General Assembly of Maryland confirmed the act of Virginia incorporating "the Chesapeake and Ohio Canal Company." The confirmatory act sat out with a declaration that, by accepting the act of Virginia, the Legislature of Maryland did not intend to deny to the Congress of the United States the constitutional power to legislate on the subject of roads and canals, and closed with a provision, operating as a conditional defeasance of the act itself, in the event that an additional facility was not afforded to the State of Maryland for connecting her commercial metropolis, by a lateral canal, with the main stem. As this new facility simply depended on the exercise of the acknowledged power of the Federal Government over the District of Columbia, it required an application

to Congress alone. On being made, all that it asked was promptly conceded, by an act of the 3d of March, 1825. The same act also expressed, though in ambiguous terms, the consent of Congress to the Virginia Charter; but yet, when attentively examined, admitted of but one legal construction, and that adapting the act itself. to its obvious end. It remained, now, for the accession of the existing Potomac Company to the terms of the new charter, to complete the power of extending the Chesapeake and Ohio Canal as far West, in its prescribed course, as the common boundary of Pennsylvania and Maryland.

On the 16th of May, 1825, the Stockholders of the Potomac Company, at a special meeting, unanimously accepted the terms which the *new* offered for the surrender of their *old* charter; and, in the following Summer, the President of the United States and the Executives of the States of Maryland and Virginia, on the application of the Central Committee, appointed Commissioners to open books of subscription to the stock of the New Company.

The assent of Pennsylvania still continued to be withheld, notwithstanding the zealous exertions of the friends of the proposed canal in the popular branch of her General Assembly; where a bill, designed to perfect the new charter, after a protracted discussion, and being encumbered with amendments incompatible with its object, was indefinitely postponed.

A charter, however, did, and does at this time exist, in a form competent to the execution of the greater part, if not the whole of the proposed Canal, and it awaits only the subscription of the necessary funds for the commencement of a work to which, in its future progress, the consent of Pennsylvania might be confidently expected.

The Commissioners, however, authorized to open books for the subscription of stock, acting in concert with the Committee, deemed it expedient to defer the execution of this trust, and have continued to do so, for reasons, in explanation of which, it is necessary to recur to the period when this narrative began.

At the commencement of the Session of Congress, which next followed the meeting of the Convention, the President of the United States, in adverting to its proceedings, suggested the expediency "of providing, by an adequate appropriation, for the employment of a suitable number of the officers of the Corps of Engineers to examine the *unexplored ground*, during the next season, and to report their opinion thereon. Pursuing the object of one of the resolutions of the Convention, "it will be likewise proper," the President added, "to extend their examination, to the several routes, through which the waters of the Ohio may be connected, by canals, with those of Lake Erie."

The resolutions of the Convention expressly contemplated a connecxion of the tide of the Potomac with the regular steam boat navigation of the Ohio river, by a single canal, passing through the territory of the United States within the District of Columbia, along the common river border of Maryland and Virginia, as high up as the mouth

of Savage; thence, through the Territory of the former, and of the adjacent State of Pennsylvania, as far West, if necessary, as the confluence of the Alleghany and Monongahela rivers, at Pittsburg. They sought, also, to provide, by a distinct canal, for a termination yet more remote, and, emboldened by recent intelligence from Ohio, looked along the valleys of the Big Beaver and Cuyahoga rivers, to the Southern shores of Lake Erie, and a connexion, by an unbroken and uniform inland navigation, of the Seat of the Federal Government with the Atlantic, the Gulf of Mexico, and the great Northern Lakes.

By acquiring for the State of Maryland a right which she did not before possess, to make a lateral canal between the waters of the Potomac and the Patapsco, or any other river of her territory, they further designed to promote an extension of this navigation to the commercial metropolis of the Chesapeake, and to such other points on that great estuary as her interests might hereafter recommend.

So much of this extended line of artificial navigation, as, pursuing the valley of the Potomac from its tide, terminates at Western Port, the base of the Alleghany mountain, could not be regarded as *unexplored ground.* The Ohio Company of Maryland and Virginia, which established the town of Cumberland, in the year 1749, at that early period, used the river Potomac for the purposes of transportation; and proposals to lock its principal Falls were published in Europe before the war of the Revolution, at a period when the British Ministry had under favorable consideration a proposal to erect a new Colonial Government West of Virginia, West of the Allegany, on the river Ohio.

By the "Potomac Company," created in 1784, at the instance of General George Washington, the total descent of this river from the same point, as well as its length, had been ascertained by examination and survey. At a very recent period, following, immediately, however, the first suggestion of the possibility of uniting the waters of the Potomac and Ohio, by a navigable canal across the dividing ridge, as a substitute for the very laborious portage between those rivers, the principal Engineer of Virginia, first, by authority of the Board of Public Works of that Commonwealth, and, afterwards, under the joint authority of the States of Maryland and Virginia, in conjunction with an experienced civil Engineer of the former, carried the long antecedent survey and examination of the waters of both rivers, to Deep Creek, in the Glades of the Alleghany, and in both instances, ascertained their levels and distances so far, towards the Ohio, as to induce the belief that their junction, by a canal, was practicable. As far as the mouth of Savage it was undoubted: and as far up as Cumberland, an estimate was supplied under the authority of the Commissioners deputed by the States of Maryland and Virginia to superintend the second survey. The inexhaustible banks of coal, of superior quality, bordering immediately on the Potomac, and rising far above its surface, constituted the chief motive for terminating, at the mouth of Savage, the Eastern section of the Chesapeake and Ohio Canal; the value of this mineral being believed to be competent,

alone, to defray the cost of constructing so much of the proposed canal, the practicability of which had been already demonstrated. An estimate for so much of the work had been submitted to the Convention, along with a detailed financial plan to provide its amount, which had also received their approbation.

From the mouth of Savage, in the line prescribed by the Convention and recommended by the antecedent reports of the Virginia and Maryland Engineers, a further survey and corresponding estimates were necessary throughout the Western section; and the termination of the Chesapeake and Ohio Canal, on the Western waters, remained to be fixed, in reference to its ultimate extension, by Pittsburg, to the shore of Lake Erie. This constituted the *unexplored ground.*

As the profit of the Eastern section of the canal would be immeasurably promoted by placing beyond the reach of a rational doubt the practicability of extending it, with a sufficient supply of water, across the mountains, which now oppose so formidable an obstacle to the direct trade of the valley of the Ohio and Mississippi with the seaports of the Chesapeake and the Atlantic, it was deemed expedient to delay an appeal to the public enterprise, for subscriptions of stock to defray the cost of this extensive work, until this propitious confidence should be confirmed.

An extension of the navigation of those great Western rivers, by one canal, to the cities of the District of Columbia; by another, from the head of their navigation to the Northern lakes; by a third, from the markets of the Potomac to that of the flourishing city of Baltimore; by a fourth, then in rapid execution, to the long established market of Philadelphia; and, by a fifth, already provided for, to the present emporium of the foreign trade of the United States, in New-York; could not fail to attract the wealth of Europe, as well as America, and to multiply the chances of obtaining that portion of the capital stock, necessary for the completion of the Chesapeake and Ohio Canal, for which the Convention relied on individual subscriptions.

The President's recommendation to Congress was succeeded, in the same session, by a public act making the specific appropriation which he had suggested, for obtaining plans and estimates of such roads and canals as he might deem it expedient to cause to be surveyed, with a view to the transportation of the mail, the commercial intercourse, and military defence of the United States.

In the execution of this act, a supervising and administrative "Board of Internal Improvement" was created, by order of the Executive, consisting of two military Engineers, and a civil Engineer. At their head was placed a distinguished naturalized citizen of the United States, an officer of various science and of great ability and experience in the art of military fortification; and twelve topographical Engineers, with six surveyors, were subjected to the order of the Board, with instructions to make an immediate reconnoissance of the country between the "*tide waters* of the Potomac," and the "head of the steam-"boat navigation of the Ohio," and "between the Ohio and Lake Erie, "for the purpose of ascertaining the practicability of a communication

"between those points; of designating the most suitable route for the "same; and of forming plans and estimates, in detail, of the expense "of execution." The Chief of the Engineer Department closed this order, of the 31st of May, 1824, by suggesting, "that it was very "desirable the report should be received, on this line of communica-"tion, in time to be submitted to Congress at their next session," and instructed the Board to use every possible exertion to effect that object.

The first Report of the Board was submitted to Congress, by the President, on the 4th day of February, 1825. It not only placed beyond doubt the practicability of conducting a canal, with a sufficient supply of water, across the Alleghany, by the route of the new charter, on which the principal Engineer of Virginia, and the civil Engineers of both Maryland and Virginia, had made a favorable report, sanctioned by the Commissioners of those States; but ascertained, with like certainty, the possibility of extending this communication, with much greater facility, from Pittsburg to Lake Erie.

As the Report of the Board was not designed to supply an estimate of the probable cost of any part of the Chesapeake and Ohio Canal, it afforded no answer to a very natural inquiry of every subscriber to its stock, and the motive for delay still continued on the part of the Commissioners deputed to open books for subscription. This motive was confirmed by the intimation that the Board were about to extend their survey and estimates throughout the entire valley of the Potomac, or the Eastern section of the Chesapeake and Ohio Canal.

The authority to construct this Canal, as far as the Pennsylvania line, was now confirmed by the States of Maryland and Virginia, as well as by the United States, a necessary party thereto, and its chartered route was established by law. Its actual commencement awaited only an adequate subscription to its stock.

It will be believed by the Convention, that, on the part of the Central Committee, every exertion has been made compatible with the respect due and felt for the able officers engaged in the arduous duty of making these surveys and estimates, to expedite their *reports* and to guide *them* to the objects embraced within the charter.

In the spirit which prompted those efforts, it is to the Committee, as it must be to the Convention, a subject of regret that, while an estimate is furnished of the cost of a Canal, from Georgetown to Cumberland, it is accompanied by no calculation whatever of the probable cost of the residue of the Eastern Section of the Chesapeake and Ohio Canal, between Cumberland and the Coal Banks of the Potomac, in the report of the Board of Internal Improvement of the 23d of October last.

Without this estimate, or some equivalent substitute for it, a comparative calculation of the expense and profit of the Coal trade upon the Eastern Section of the Canal, cannot be supplied, in the mode contemplated by the Convention; nor can the survey and estimates be deemed to be complete, for which the active friends of this enterprise, together with the Convention, their Committee, and the Public Commissioners of the States and of the United States, have so long awaited in anxious expectation.

It is due to the Engineer Department, at the same time, to state, that the general result of the estimate of the far greater part of this section, was supplied, as it is believed, at some inconvenience by the Board, to the Central Committee during the last Winter.

Without a detailed analysis of the prices of materials and labor, on which it was founded, and startling in its gross amount, this estimate reached the Committee at so late a period of the last session of Congress, as to baffle all hope of grounding upon such a basis, without farther assistance, a successful application to the National Legislature, in the few last weeks of a protracted Session, for a subscription to the stock of the proposed Canal.

In the belief arising from an imperfect understanding of the facts assumed by the Board in their late communication, that the detailed estimates of the whole of this section might furnish the means of arriving at a more favorable, as well as a more correct result, and be accompanied, before the final close of the Session, by an estimate of the cost of the entire Canal, the Committee availed themselves of the opportunity just then supplied, by the recent act of the State of Maryland, authorizing, on certain conditions, a subscription of half a million of dollars to the stock of the Chesapeake and Ohio Canal, in order to bring the subject before the House of Representatives by a memorial, in which they were joined by the Commissioners of the States, and of the General Government.

On this memorial, a favorable report was made to the House, by the Committee on Roads and Canals, which, however, being neither preceded nor accompanied by a further communication from the United States' Engineers, nor indeed printed, before the close of the Session, could not be called up for consideration.

In the interim, the Legislature of Pennsylvania, by an act passed at a very late period of their last Session, conceded, under numerous conditions, their long withheld assent to the charter. It was designed, if approved by the other parties to the charter, to complete the legal authority, to construct the Chesapeake and Ohio Canal, by any route through the territory of that State, to Pittsburg. To some of the superadded conditions, the Committee purpose, hereafter, to call the attention of the Convention. If this act be approved, or modified so as to be rendered unexceptionable, it will remain for the States of Ohio and Pennsylvania to promote, separately, or to concert together, some practicable scheme for extending the Canal, pursuant to the resolutions adopted at the former Session of the Convention, from Pittsburg, by the most eligible route, to Lake Erie.

While obstacles which the Convention did not anticipate, impeded the progress of their extensive enterprise, other routes for certain parts of the proposed Canal, extending between the head waters of the Potomac and the Ohio, have been suggested. Two of these, deriving their supply of water, in part, from the same summit level, that of Deep Creek, look to the South, along the valleys of the Little Kenawha, and Cheat rivers, in Virginia, for their descending lines of connexion with the Ohio; while a fourth, leaving the Potomac about thirty

miles below the mouth of Savage, and turning Northwardly, reaches a summit level of less elevation than the former, fed by Casselman river, in Pennsylvania.

This last route has received the sanction of the United States' Board of Internal Improvement, in their final report of the 23d of October last.

All their estimates are made conformable to it, and their decision in its favor, serves to account for the absence from that report, of any calculation of the probable cost of a Canal along the margin of the Potomac, between the mouth of Wills' Creek and of Savage.

This decision does not, however, in the opinion of the committee, supersede the use of such an estimate; since it is more than probable, if not absolutely certain, that the supply of the single article of mineral fuel, to say nothing of the inexhaustible beds of iron ore, and of the extensive forests of valuable timber, on the North Branch of the Potomac, would amply repay, in time, the work of the entire Eastern Section of the Chesapeake and Ohio Canal.

Whether this Section shall be conducted above the mouth of Wills' Creek, for any other purpose, than that which has been described, and the general commerce to be drawn from the country at its Western extremity; or be altogether superseded by the recently discovered route, from Cumberland by Wills' Creek, to the mouth of Casselman's river, is a question to be decided by the Company which may hereafter arise under the new charter, although it is one which constituted, along with other considerations, and especially the request of the Federal and State Commissioners, already known to the Convention, a sufficient reason, in the judgment of the Central Committee, for exercising the authority with which they supposed themselves invested, of inviting a reassemblage of the Convention, and an enlargement of its representation.

They were measures, calculated, the Committee believed, to further the speedy "completion" of the great work confided by the resolutions, under which they were appointed, in some degree, to their consultation and management.

The concurrent acts of the three States, and of Congress, from which, with the assent of the Potomac Company to their provisions, the new charter derives its legal existence, now, indeed, control, by the authority of law, the Convention, and its Committee.

But no doubt can be entertained, but that the same liberal councils which yielded to the memorials of the Convention a charter of incorporation to the Chesapeake and Ohio Canal Company, would lend a favorable ear to similar memorials, for such amendment of that charter, as its beneficent purpose may require.

While the Committee feel it incumbent upon them to admit the force of the argument submitted by the very able report of the United States' Board of Internal Improvement, in favor of the more Northern route, from Cumberland to the mouth of Casselman river, for the main Canal; they are not prepared to recommend to the Convention an abandonment of that portion of its Eastern Section, which extends from Wills' Creek along the Potomac, by the Coal Banks, to Savage.

The Board appear to have weighed, impartially, the relative advantages of both routes for a Canal across the Allegany by Savage, and by Wills' Creek, and to have compared them in their most essential particulars. Their demonstration that the Wills' Creek and Casselman's route will be less expensive by more than half a million of dollars, than that by the Valleys of Savage and Deep Creek; its supply of water nearly the same; its location more secure from accidental injury or suspension; its summit level less elevated, by 436½ feet, and less liable to be obstructed at its extremities; and its actual length shorter by 18 miles; is entitled to very serious consideration, and would justify, of itself, an application to the competent authorities, so to amend the new charter, as to leave the future company at liberty to avail themselves of a choice between them. Nor does it seem to the Committee wholly immaterial, to notice, in this view, that the inconvenience of a much lengthened tunnel, which constitutes the chief objection to the Northern route, whenever the growing commerce of the Eastern and Western States shall both warrant and require such expense, may be obviated in a great measure, by a parallel tunnel, excavated and ventilated by means of the shafts of the first, without interruption to the use of the Canal, during its construction; and that this additional tunnel may be supplied with an additional quantity of water, by a feeder, also costly indeed, but not impracticable nor difficult of execution, drawing its supplies from the more elevated reservoirs of the Deep Creek summit, to that which the Board of Engineers have preferred; or, if to this remote and contingent expenditure, it be objected, that it would be better economy to incur the immediate cost of a tunnel sufficiently wide, for the boats to pass each other within it, from opposite directions, the comparative cost of both these remedies of the inconvenience and delay of a tunnel admitting the passage of boats in but one direction at a time, would deserve to be maturely weighed. The addition of ten feet to the breadth of the tunnel at the water line, with another tow-path of five, would double the use of this part of the Canal, by permitting its boats to pass through it, at the same time, in opposite directions, and by greatly diminishing the resistance of the propelling power, favor the velocity of their motion, and allow their more speedy passage.

But neither the Convention, nor the parties to the New Charter, nor the Company to which it may give rise, will be required to make an immediate choice between these routes, except, in the event, rather to be hoped than very confidently expected, that the sum necessary to complete the whole Canal shall be immediately subscribed, and its execution, through its entire line, be instantly commenced. If the several parts of it be accomplished seriatim, a preference is due first to that portion of it which shall connect the Coal Banks with the navigable waters of the Chesapeake; next, to that which shall shorten the portage between the Eastern and Western waters; and last, to the intermediate mountain Section, which shall finally unite them.

This order of the completion of the entire Canal will accord, moreover, with the views of those friends of this central communication

between the Eastern and Western waters, who deem it expedient to substitute inclined planes or railways, or both, with fixed and movable steam engines, for a canal across the Allegany mountains. Time, and the light of experience, which the wide diffusion of the spirit of internal improvement is about to shed upon the relative advantages of canals of great lockage, and railways, may clear up the obscurity which now rests upon this new subject of controversy before the arrival of the Chesapeake and Ohio Canal, at the base of the Allegany, shall require its decision.

But if, as the United States' Board of Internal Improvement appear already inclined to determine, it may hereafter be considered expedient to substitute, for what they term the middle section of the Chesapeake and Ohio Canal, an iron railway, a part of their argument in favor of the Northern route from Cumberland must be surrendered, since, with a lower summit level, it has a mountain of higher elevation at the tunnel, by near 200 feet, to contend with, than that, upon the Southern route, by Savage river.

All that this reasoning, therefore, tends to enforce, in its application to the present purpose of the Convention, is, the policy of leaving the future canal company at perfect liberty, of the various routes and expedients for obviating their greatest difficulty, to select the best.

It will suffice, then, for the present, so to amend the new charter, as to authorize, at the discretion of the company which may arise under it, a limitation of the Western end of the Eastern section of the canal to Cumberland, on the Potomac; the substitution, in like manner, in any part of its route, thence, towards its Western termination, of inclined planes and railways, for a continued canal, and the power to vary its route, from Cumberland, in any direction suitable to a connexion of the Ohio and Potomac, by a navigable canal, or railway; retaining to the Company, however, in case the Northern route for the main canal shall be preferred, the power of reaching the Coal banks at the mouth of Savage, by another canal of reduced dimensions.

In one view, it is perhaps not to be regretted that the new charter did not originally embrace this authority; since it might only have distracted the public attention from a route then known, and still admitted to be practicable, and the further examination of which has ascertained the possibility of gathering in ample reservoirs at a level four hundred and thirty-six feet and a half above the Wills' creek summit, even more water than the Casselman's river and its tributaries can supply, and at a distance from the latter of little more than fifteen miles, along which, as well as the feeders that connect the double reservoirs of each summit, a supply of water might be conducted from the higher to the lower summit, without either absorption, leakage, or evaporation, if to remedy a deficiency of water be its only purpose, in subterranean pipes or cylinders of iron, at comparatively moderate cost.

Another act of justice is due, and cheerfully rendered, by the committee, to the United States' Board of Internal Improvement, in reference to that part of their scientific report which relates to the breadth

and depth, or the dimensions of the transverse section of the proposed canal.

This view of its structure must indeed be included in that comparative view of its probable cost and utility, which enters into every rational calculation of profit made by the subscribers to its stock, or of the means of defraying the expense of its construction.

A principle in the experimental philosophy of navigation which was not known to the Convention, when, after some investigation, they limited the breadth of the canal, by their resolutions, to a minimum of forty feet, and its depth, to a minimum of four feet, being the breadth and depth of the New York canals, is supplied by the report of the U. S. Board of Internal Improvement. They confirm the expediency of that limitation, and recommend an enlargement beyond it, of the transverse section of the canal, as the charter was designed and is calculated, should expediency warrant it, to admit.

The greater resistance encountered by the boats which navigate the Schuylkill canal, compared with that which they meet upon the broader surface of the river, had disclosed to vulgar observation this principle, in itself so obviously accordant with reason, but the experience of the United States had not supplied the precise measure of its influence upon canal navigation. The Board of Internal Improvement have applied the experimental knowledge of France to demonstrate, with irresistible force, "that the cross section of a canal," in order to avoid the resistance of a confined surface, "ought to be, with moderate velocities, $6\frac{46}{100}$ times the cross section of the boat, and the water line" of such surface or canal "four and a half times the breadth of the boat."

"Allowing $13\frac{1}{2}$ feet for the breadth of the boats to be used upon the "Chesapeake and Ohio Canal (which is the breadth of the Erie and "Ohio Canal boats) and their draft to be three feet, it follows that "the water line should be $60\frac{3}{4}$ feet, being four and a half times the "breadth of the boat, to enable it to move along the canal with a re-"sistance not exceeding that which it would encounter on an indefi-"nite expanse of water."

For the sake of economy in the construction of the Chesapeake and Ohio Canal, the Board recommend, however, a breadth of forty-eight feet, and a depth of five feet water; and they infer that, on such a canal, compared with one of forty feet breadth and four feet draft of water, with "a gain of about seven per cent. of towing power," in favor of the former, "the weight which may be transported on the broader surface will be one-third greater than that which may be transported during the same time, that is, with the same velocity, on the forty feet surface." From these facts and principles the Board deduce this interesting conclusion, that, on the Chesapeake and Ohio Canal, in length $341\frac{3}{4}$ miles, having a lockage of 3158 feet, but with a breadth of forty-eight, and a depth of five feet of water, the same tonnage may be transported in the same period of time, with the same towing or propelling power, and, therefore, at the same cost, as on a canal of the same length, with a lockage of no more than 600

feet, but of the breadth, at the water line, of forty feet only, with a depth below it of but four feet.

The difference of resistance offered by these different volumes of water, to a boat passing through them, being equivalent to a difference of 2558 feet of lockage upon a line of 342 miles of canal, allowing a minute's delay per foot of perpendicular lift at each lock. The length of the Western canal of New York is 362 miles: its lockage is 683 feet. A given tonnage, therefore, being required to be transported from Albany to Buffalo, by the Erie Canal, and from the District of Columbia to Pittsburg, by the Chesapeake and Ohio Canal, having a depth of five feet and a breadth of forty-eight feet, it would arrive at its destination in less time, and, being propelled by the same force, at less cost, also, on the latter, than on the former canal.

While, however, this conclusion, founded on the certain deductions of experimental philosophy, exhibits in a strong light the expediency of resorting to the broader and deeper canal, if regard be not had to the greater cost of its construction; the profitable results of the small canals of England, to the capital invested in the structure, and the counties and cities whose commerce they facilitate, alike demonstrate their vast superiority to the best turnpikes; and the magnitude of the first expenditure on so extensive a work as the Chesapeake and Ohio Canal, deservedly received the consideration given to the manner of constructing it, by the Commissioners deputed to receive subscriptions to its stock.

In regarding its practicability, as well as its future utility, its construction must have reference to its *cost*, as *that* must, of necessity, have a like reference to the means of defraying *it*.

While the Central Committee render every just tribute to the labor, learning, and ability, displayed by the United States' Board of Internal Improvement, in their late reports, they are led by their own experience, and by information derived from sources entitled to the highest respect and confidence, to question the accuracy of such portions of their tables of estimates, as present to the judgment, facts, occurring daily, within the sphere of common observation, rather than in the paths of scientific research; such are the wages of labor, and the prices of the materials required for the construction of those parts of a canal which resemble the ordinary works of the coarsest arts in the country adjacent to the line of the canal: such, also, are the quantities of labor which can be performed on such works, by ordinary artificers or laborers, in a given time.

To ascertain these particulars, by inquiries from a source in which the Board and the public could not but confide: from men of integrity and experience, most cognizant of them from their places of abode and their daily pursuits, and whose authority would be conclusive on all the doubtful topics of estimate, constituted, indeed, one of the objects which prompted the Central Committee to invite the Convention to reassemble in the city of Washington, and to extend that invitation to the counties and other corporations interested in the end of its deliberations, and who were unrepresented at the former meeting.

Among a body so constituted, and a People previously apprized of the objects of their approaching re-union, there must exist many individuals who derive from their own observation, or come charged with the results of the experience of others, as to the details of an estimate of the probable cost of the labor and materials required for the very simple purposes of excavating, embanking, walling, and paving a canal, and fencing along its border.

The quantity of each species of this work, to be executed on any section or subdivision of the canal, depends, indeed, on estimates founded on a scientific application of the structure of the canal to the ground along which it is designed to extend it, and the quality of that ground; but the quantity being ascertained, and the manner of its execution determined, science has performed its office, and common experience, combined with an actual acquaintance with the resources of the country, must do the rest.

Confining their remarks, for the present, to the estimates of the Eastern section of the canal, which the Board propose to terminate at Cumberland, the distance of 186 miles from Georgetown, it appears that they have computed the cost of that section at $ 8,177,081 05, for excavation, embankments, walling, lockage, aqueducts, culverts, bridges, puddling, paving, dams, waste weirs, and gates, fencing, basins, and certain items not reducible to any general head of expenditure, but few in number, and amounting together, to an inconsiderable sum.

Of the specific heads, the five, first mentioned, cover near seven-eighths of the total cost of this section, in the proportions,

For excavation, of - - - - -	$2,515,176 46
embankments, - - - - -	685,456 11
walling, - - - - -	2,737,808 68
lockage, including guard locks, - -	997,300 00
aqueducts, - - - - -	521,696 00
Being a total amount of - - - -	$7,457,437 25

Of the residue, or $719,643 70 of the estimated cost of this section, culverts, bridges, puddling, paving, and fencing, make up the sum of $532,109 11 more, leaving for miscellaneous items $ 178-534 59.

The lowest price allowed for excavation is 14 cents the cubic yard, and the highest $1 65. The price per cubic yard for embankments varies between 12 and 42 cents. Of walling, 31 miles, the cost is from $ 3 to $ 5 18 cents the cubic yard, which makes the cost per mile, in lineal extent, average more than $ 88,000. The lifting locks are computed, throughout, at $ 1,500 the foot lift. The masonry of the aqueducts, it is presumed, according to the same data. The puddling, amounting to $ 122,186, at 12 cents the square yard of 18 inches thickness: the paving amounting in cost, to $ 122,186, at 82 cents the square yard; and 175 miles of fencing, at $ 900 the mile.

The Committee have arrived at some of these results, with some care and at some expense of time, in reviewing, during the short period allowed them, a work of much labor.

They forbear to anticipate the judgment of the Convention on an estimate adjusted to the compensation of one dollar a day for a common laborer, at work for ten hours, in a country, abounding with the necessaries of life, and already possessing, along the greater part of the line of the canal, some of the advantages of navigation, to equalize their value, and where peculiar causes conspire to check the sudden rise of the wages of ordinary labor; and this price, extended to its humblest offices, is, moreover, augmented for the attendants in the subterranean tunnel, and in employments of like exposure.

In an estimate, believed by the Committee to exceed in amount the probable cost of this section of the canal, they have reduced these specific expenditures to 5,000,000 dollars, allowing, as part of that sum, four hundred thousand for unforeseen contingencies.

The Committee doubt not but that this estimate might be yet further reduced, and that the estimates of the other sections of the canal would admit of a larger ratable deduction, since peculiar errors enter into their formation; as a computation for the tunnels and the reverse arches at the bottoms of the locks, of hard burnt bricks, of dimensions reduced to eight inches in length and two in thickness, but of four inches breadth, at $5 per thousand, on a supposition that but 60,000 of such bricks could be supplied by a kiln of 100,000, burnt in a country where wood is a nuisance; that common limestone does not exist, because it does not appear on the surface of the earth, and that lime, for water proof cement, cannot be had nearer than the Canal of New York, although it had not been searched for in the country most requiring its use; and it has, in fact, the committee is credibly informed, been since discovered there in great abundance, on the margin of a Western river.

These errors, if they are such, in a very able and valuable report, do not affect in any degree the merit of its authors as scientific men, nor are the Committee prompted to note them, but by an imperious sense of duty.

To the unassuming personal and moral worth and to the indefatigable industry of the distinguished member at the head of the Board of Internal Improvement, they unite with their fellow-citizens in according the well earned meed of public applause, nor do they withhold their thanks from his coadjutors in a work of equal labor and skill. The Board have failed only where less ability was competent to the task which they have endeavored to perform, under impressions, perhaps, that the work, which they estimated, would readily command the wealth of a nation for its construction, and with feelings which would be less wounded by the discovery that they had under, rather than overrated its cost.

Of their errors, it should also be remarked, that in the patient and ingenious analysis of their constituent elements, the Board have afforded an easy corrective, since they have left nothing to be supplied by

those who follow them, but the labor of common sense, guided by the knowledge of common experience.

In one of the estimates, submitted to the Convention in 1823, the transverse section of the Chesapeake and Ohio Canal was assumed to be, at the water line, 40 feet, at the base, 28 feet, with a depth of four, which, multiplied by the mean breadth, between them, gave a surface of 136 square feet; while the canal, estimated by the Board, having a mean breadth of 40.5 feet, and a depth of five feet, has for its transverse section below its water line a superfices of 202.5 square feet in extent, and would cost, for excavation alone, according to the estimates of the Board, $ 838.000 less than that which they have recommended, and this without any reference whatever to several circumstances in the ground over which the two canals would pass, tending much to augment the cost of that which has the greater breadth.

It was, therefore, with a prudent regard to the practicability of obtaining funds for the accomplishment of this great work, that the Federal and State Commissioners have forborne to open books for the subscription of its stock, not only until the estimates of the Board had been received, but until some calculation might be made of the extent of the aid that may be derived from those sources of wealth, on which a work of such vast political importance naturally relies for the means of its execution.

While the private subscriber to its stock, may, indeed should be expected to regulate the amount of his subscription to such an enterprise, by a consideration of its immediate or remote returns in the shape of dividends or profit: while the cities, whose trade may be advanced by it, shall blend with this consideration, that of the augmented value which its success must bestow upon their fixed and active capital;—the States so deeply interested in it, may be expected to regard this prospective income, as of inconsiderable moment compared with the internal resources which so extended a line of inland navigation must promptly develop—the wealth which it must generate, employ, and enlarge—the population which it must attract, fix, and multiply;—and the Government of the United States, strong as is its obligation to the District of Columbia, of which the founders of the Federal Republic have constituted it the paternal guardian, must more sensibly feel that, by the accomplishment of such an enterprise, a new momentum will be imparted to its defensive power, whether exercised upon the land or the sea, and an indestructible bond provided for the Union, and with it the prosperity of the People, for whose security, freedom, and happiness, it was instituted.

Whether the powerful appeals which these interests and obligations address to the councils of the States and of the Union, shall be successful, futurity only can determine. It is for the Convention to hasten its favorable decree, by presenting to those councils, the ardent wishes, the just hopes, and the confident expectations, of their numerous constituents.

If, with the Government of the United States, the acquisition of wealth were an exclusive object, it is believed, that, in the rapid appre-

ciation of the public property in this District, and of the public lands to the West, which would follow the completion of the Chesapeake and Ohio Canal, it would find a sufficient inducement as a proprietor, for applying a part of its annual revenue, and its credit, to the improvement of its fixed capital.

Already, indeed, a new and improving branch of agriculture, deriving its spring from an access to the markets of the Chesapeake, has enriched a large part of the State of Ohio, and will contribute to double, very speedily, the revenue of the Union, from the sale of those lands. But the customs are alike improveable, as the Commitee have noticed on a former occasion, by every augmentation of the exported produce of the United States. The returns which are received for them, from abroad, do not merely replace the native value of each exported commodity, but comprehend the freight, mercantile profit, and numerous charges of its transportation, one fourth, at least, of the whole of which, enters the public treasury; while the consumption of the foreign products that constitute these returns, extending with inland navigation, and the diffusion of newly created wealth, reduces the debentures discounted from the dues of the Custom House.

The Committee are conducted by these views to the most interesting topic which they have felt it to be their duty to submit to the Convention, involving an inquiry into the best means of giving effect to the new charter by an adequate subscription to its stock.

The former resolutions of the Convention separated the legal authority to make the proposed canal from the pecunary means required to give that authority effect. In like manner, do the Committee recommend it to the Convention to proceed in endeavoring to obtain such amendments as the new Charter may be deemed to require. The only one which has seemed to them necessary, they have already suggested, and of its ready accordance by the present parties to that instrument, there cannot exist a doubt. Pennsylvania has even anticipated the application of the Convention, by authorizing an extension of the Canal from Cumberland to Pittsburg, by any route through her Territory, which may be hereafter thought most expedient. She has, in the first section of her "Act incorporating the Chesapeake and Ohio Canal Company," assented in the most unequivocal manner to the Charter of Virginia. To the 3d, 4th, 6th, 7th, 8th, and 9th, sections, which qualify that assent, no material objection arises, in the judgment of your committee. But, if the second section be susceptible of a construction which, by giving as unrestricted a power to any future company to use the waters of Pennsylvania, required for the Chesapeake and Ohio Canal, as the new Charter gives to the Company that may arise under it, to suggest an error in this act, so palpable, would lead, it is confidently believed, to its prompt correction. For otherwise, this section must operate as a complete retraxit of all the power that is granted by the first, and the very reservoirs of the summit level, should the route by Wills' Creek be preferred, may be exhausted for the use of some lateral canal, without a violation of the

chartered rights of the Chesapeake and Ohio Canal Company. A literal construction, leading to such a result, it is to be presumed no court of justice would technically enforce: but as this act has not yet been accepted by the other parties to the new Charter, and is open to easy amendment, the Committee have deemed this notice of it expedient, if not necessary.

To the 5th, and only remaining section, more serious objections arise. It is contradictory and subversive of the whole plan of the Convention, digested with much labor and circumspection at their first meeting. To the provision of this section that such part of the stock of the Canal Company as may be subscribed by the citizens of Pennsylvania, shall be applied exclusively to the Western section of the canal, unless the subscribers shall give to their subscriptions a different direction, however inconsistent with the scheme of a joint stock company, less objection might be entertained, if it did not involve a consequence designedly excluded by the charter in its present form: an obligation to begin a work without any security for adequate funds to complete it, and which, while incomplete, must be almost wholly unproductive: and such a division of the funds of the company between the two sections of the canal, as would render it impracticable, perhaps, to finish either before the loss of profit on the unproductive capital actually expended, would be equivalent to that capital.

Such a measure would paralyze all the hopes of success, in this entire work, which are derived from the assured profit of its Eastern section, by remotely deferring that profit, and consequently preventing all other subscriptions to its stock.

If such a destination of the Pennsylvania subscription stopped short of this effect, the other branch of the condition expressed in this section would render it inevitable.

The friends of the Chesapeake and Ohio Canal have always relied, for reasons which have been already expressed in this report, and often before repeated, on a liberal participation, by the United States, in the expense of its construction. Without such a co-operation on the part of the United States in this great work, it has been deemed to be impracticable. To conciliate that co-operation, it should be rendered as light a burthen, as it can be made, on the public treasury. If the Eastern section of the Canal be accomplished, as it may be, in a few years, that burthen will then cease: for the coal trade of the Potomac will be opened as soon as that section shall be finished, and from its profit, the charter promises, not without well-grounded reasons, a part of the resources required for the completion of the Western section.

Should the subscriptions, in the first instance, be competent in amount to the speedy completion of the whole canal, then the company which will have been created, are bound by duty, as well as interest, to proceed to its execution throughout. Should they fall short of that extent, the interest of Pennsylvania, like that of every other party to the charter, requires, most imperiously, that the sums actually sub-

scribed, shall be employed so as to yield the greatest immediate profit. In a Commonwealth so distinguished in the career of internal improvement, reasons founded on such obvious expediency, it is hoped, will not prove unavailing, and the Legislature of Pennsylvania perceiving, will have the candor to acknowledge their force, and the liberality to disencumber her assent to a measure of such evident importance to the prosperity of a large portion of her citizens, of a condition destructive of its own purpose.

The Committee propose to vary to no great extent the plan of finance which they now proceed to recommend to the Convention, from that which their former resolutions have already sanctioned. They deem it advisable to lay its foundation in an application to the Congress of the United States, to the States who are parties to the charter, and to the cities most deeply interested in the execution of its great purpose, for a subscription to its stock. Individuals would more readily embark in an enterprise which had already received so imposing a sanction, and the vigilance of private interest would serve as a guarantee of the economical and faithful application of the public money.

The committee, pursuing the views which they have already in part suggested, cannot but hope, that the superior interest which the Federal Government must feel in the success of the labor of the Convention, and the more abundant resources of revenue and credit which the United States possess for promoting its speedy prosecution, will induce the Congress of the United States to authorize a subscription of one moiety of the stock required for the whole, or at least, for one section of the canal, under a regulation, as liberal, as that which constitutes an essential feature of the constitution of the Virginia fund for Internal Improvement. If a subscription of one moiety of the stock of the Chesapeake and Ohio Canal can be obtained from the United States, accompanied with a condition that such moiety shall be entitled to no dividend or profit, till the subscribers of the other moiety shall have netted five per cent. per annum on the sums which they may have respectively paid into the treasury for the future company, a doubt need not exist of the prompt execution of this noble enterprise. And yet this is less, by one per cent. per annum, than the Legislature of an individual State, with unprecedented unanimity, accorded not to its own citizens exclusively, but to all capitalists, whether foreign or domestic, who might be disposed to embark their private fortunes in works of great public utility.

What better use can be made of such portion of the common treasure, as is destined to promote the common safety and happiness, than to give it a direction calculated to elicit the wealth of the most sordid private citizen, or of the remotest foreigner, for the same beneficent and noble object? Restricted to the encouragement of new enterprises of unquestionable national utility, such an application of public wealth is founded in wisest economy.

The Central Committee finally close their report by recommending to the Convention the adoption of the subjoined resolutions:

Resolved, by the Convention, that it will be expedient to obtain such an amendment to the charter of the Chesapeake and Ohio Canal Company, as shall authorize the Company to terminate, if they deem proper, the Eastern section of the said canal at or near the town of Cumberland; and to extend, by any route therefrom, the Western section of the said Canal across the Alleghany to Pittsburg, or to substitute therefor a railway or other artificial road. And in the event that such a change shall be deemed expedient of the route now prescribed by the charter, to defer the extension of a canal along the Potomac, from Cumberland to the mouth of Savage, and to reduce the dimensions thereof to a breadth less than that now required.

Resolved, That it will be expedient to address a memorial to the Congress of the United States, requesting a subscription to the stock of the said canal; and a like memorial to the Legislatures of Virginia, Maryland, and Pennsylvania, and that an application be made to the cities of Washington, Georgetown, and Alexandria, to aid, by a similar subscription, the stock of the said Company.

Resolved, That a committee be appointed to prepare and submit to the Convention an estimate of the cost of the canal (founded upon the report of the United States' Board of Internal Improvement, of the 23d of October last, to the Department of War.)

Report of the Committee appointed on the 6th of December, 1826, *by the Chesapeake and Ohio Canal Convention, to prepare and report an estimate of the cost of the said Canal, founded on the report of the United States' Board of Internal Improvement, to the Department of War.*

The Committee have given to the subject their unremitted attention, since the time of their appointment, but find it impossible in the short period allowed them, to make their report as full and as perfect as could have been desired.

They have examined, however, with great care and attention, the able and scientific report lately made by the Board of Internal Improvement, which it is but just to say, reflects great credit on their industry and talents. The great error, however, into which the Board appear to have been betrayed, by a want of accurate local information, is found to consist in the extravagances of the PRICES *of labor and materials*, established as the basis of their estimate, which estimate must of course rise or fall in a ratio corresponding with the increase or diminution of this standard.

The Committee, therefore, with a view as well to test the accuracy of the estimate of the Board as to furnish one of their own, have found it necessary, in the first place, to establish an analysis and table of *prices*, corresponding to, and contrasted with, that of the Board. This being the most important, so the Committee also found it to be the most difficult and delicate part of their task. They are happy, however, in being able to state, that they have succeeded, with

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TABLE.

Prices adopted by the Board of Internal Improvement.		Prices adopted by the Committee.		Difference.	
Lime.—Average price for the whole line, per bushel,	$ 0 48	Lime.—Average price per bushel,	$ 0 18	per bushel,	0 30
Hydraulic or Water Cement Lime, 60 cents per ditto at Pittsburg— for transportation, 70 per ditto	1 30	At Pittsburg, now delivered of the best quality, from Beaver, (supply inexhaustible,) 18 cents, transportation on Western section, 25 cents.	0 43	do do.	0 87½
Brick per thousand, delivered,	6 27	(Few required on the Eastern and Western sections,	4 00	per thousand,	2 27
Stone delivered, per perch,	2 54	Per perch,	0 75	per perch,	1 79
" *wall built* with mortar, per perch,	5 36½	On Western section 1 62½—Eastern 1 87½, average,	1 75½	do. do.	3 62½
" *dry wall* built without mortar,	3 00	On do. do. 87½ do. 1 12½ do.	1 00	do. do.	2 00
Cut Stone Masonry—Cut sand stone for locks, blocks of 9 cubic feet content, per perch,	12 46	For same,	4 75	do. do.	7 71
Cut *lime stone* as above,	15 32	" do.	5 50	do. do.	9 82
Ditto not less than ½ of a cubic yard, nor more than one yard, per perch,	25 00	" same,	8 50	do. do.	16 50
		" same, { Western district 50 / Eastern do 62½ }	0 56¼	per day,	0 43¾
Labor.—For common day laborers the lowest estimate is, per day,	1 00	" same,	4 00	per cubic yard of 638 bricks,	4 36
		" same,	4 87½		
		" same, (Western district,)	8 00	do. do.	5 51
Brick Work.—For cubic yard 638 bricks for walls,	8 36	Locks are built on Ohio Canal for $420 per foot lift, and on Pennsylvania Canal for $400, 90 feet long, 16 feet wide, and 4½ deep; add $100 per foot to increase their size to that of the Chesapeake and Ohio Canal, viz: 102 feet long, 16 wide and 5 deep,	500 00	per cubic yard,	13 49
Same ditto for arches,	10 38				
Water Cement per cubic yard of mortar,	21 49				
Locks per foot of lift,	1500 00			per foot,	1000 00

Excavation.—By comparing the *estimated* cost of excavation with the prices *paid* for similiar work on the Ohio Canal, and Western section of the Pennsylvania Canal, it appears that the estimate of the Board is, generally, in reference to the various species of excavation, more than double, and frequently three times the amount there paid.

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perfect *unanimity* among themselves, in adopting the following table of *prices*, which, they trust, will meet the approbation of the Convention.

In establishing these prices, the Committee had recourse to the following sources of information :

1st. To the prices *actually paid*, for labor and materials on Canals now in progress both East and West of the mountains ;

2d. To numerous reports of Committees appointed along the immediate line of the canal, to collect facts and information on the subject ;

3d. To the personal knowledge and observation of the Members of the Convention, Engineers, and others, from whom much valuable information was derived ;

4th. The actual cost of similar works, executed in the immediate vicinity of the Chesapeake and Ohio Canal route, where all the circumstances, the labor, materials, and local facilities, are the same ;

5th. Offers made by responsible men to give security and execute the work. All these tests, the Committee are happy to find, concur in establishing the *prices* they have adopted, and in proving, conclusively, that the work can be performed for about one third part of the estimated cost.

And, finally, from the analysis detailed by the Board, of the prices on which their own estimate is grounded, the Committee have inferred the source of the error of that estimate, and sought to harmonize the results of these facts, and of common experience, with the reasoning of the Board.

The foregoing *prices*, adopted by the Committee, in reference to the most important items, generally amount to about one-third part of the prices adopted by the Board, but almost invariably to much more than the prices now paid on the Ohio and Pennsylvania Canals, as appears by the following

TABLE OF PRICES.

	Ohio Canal.	Penn. Canal.	Adopt'd by Comm.	By Board.
Lime, per bushel, *average*, - - - -	$ 0 11	$ 0 11	$ 0 18	$ 0 48
Hydraulic or Cement Lime, per bushel, -	15	25	43	1 30
Stone Walls, dry, per perch, *average*, - -	44	48	1 00	3 00
Do do with mortar, do do - -	1 75	1 62½	1 75	5 38½
Cut Stone, for Locks, per do do - -	4 00	3 75	6 42	14 26
Labor, per day, - - - - - - -	40	40	56¼	1 00
Locks, per foot lift, - - - - - -	420 00	395 00	500 00	500 00*

Excavation.—The cost of excavation of the various kinds of earth and rock, varies on the Ohio and Pennsylvania Canals, from 5½ to 50 cents per cubic yard, while the estimate of the Board varies from 14 to 100, the difference being generally about as 1 to 3.

In the second place, the Committee beg leave to present, in support of their estimate, the results of various reports of Committees, appointed during the last Summer, along the route of the Chesapeake and Ohio Canal, whose especial duty it was made to collect facts, and accurate information, as to the prices of labor, materials, &c. These all concur in demonstrating that the prices adopted by the Committee are too high, rather than too low.

The average results produced by a comparison of these reports are as follows :

Lime per bushel	10 cts.	Committee adopt	18 cts.
Stone Wall, dry, per perch	68	do	do $1 00
Do. with mortar	$1 50	do	do 1 75
Brick per thousand	3 43	do	do 4 00
Labor per day	50	do	do 56¼

These reports also establish other important facts, viz : That *Stone* of the best quality can be easily procured on the immediate line of the Canal ; that abundant quarries of *Lime Stone* are found at convenient distances; that *Stone Coal*, from numerous and inexhaustible banks, can be delivered in boats on the Canal. West of the Alleghany Mountain, for from two to four cents a bushel; and it is a well known fact, that in many places in that country, banks of Coal from 12 to 15

* These contracts were made some time since: more recently the prices have fallen from 10 to 20 per cent. on the Pennsylvania Canal, and from 5 to 10 on the Ohio Canal.

feet in thickness will be penetrated and opened by the canal, for miles together; that iron ore and timber of the best quality also abound in inexhaustible quantities, and that a number of salt works are already in successful operation, and that many others may be erected, on the margin of the proposed Canal.

3dly. Still further to demonstrate the extravagance of the estimate of the Board, as well as to establish, more satisfactorily, the correctness of their own, the Committee instituted a comparison of the cost of the first section of the Pennsylvania Canal, now in progress, up the Alleghany river, with the like section of the Chesapeake and Ohio Canal, up the Monongahela; both commencing at Pittsburg, and passing over similar ground through the same country, were the prices of labor, materials, provisions, &c. are the same. Where it is found that the Pennsylvania Canal actually costs less than $9,000 per mile, while the Chesapeake and Ohio Canal is estimated, by the Board, at $13,000 per mile, though passing through a country possessing great advantages,* and requiring only 2½ feet of lockage per mile, the walling computed at only $800, and the culverts, bridges, puddling, and waste weirs, at $701 per mile. The *excavation* alone, being estimated at $29,573 per mile, or more than *three* times the whole cost of the Pennsylvania Canal, (only a few miles distant.) and at more than 4½ times the cost of the Ohio Canal, the cost thereof being less than $6,460 per mile.† And, after adding $2,000 to the actual cost of the Pennsylvania Canal, a sum sufficient to enlarge its dimensions to those proposed for the Chesapeake and Ohio Canal; still, with this addition, its total cost will be very little more than one-fourth part of the estimated cost of the latter. This difference is, however readily accounted for, when we advert to the fact, that the *walling*, which is estimated on the one at $3 40 per perch, is executed on the other for 40 cents ! ! and the excavation which costs but six cents per cubic yard on the Pennsylvania Canal, is estimated, by the Board, on the Chesapeake and Ohio Canal, at 17 cents.

The Committee, in presenting this view of the subject, it will be perceived, do not rely upon conjecture, but upon facts established and ascertained beyond all doubt; which demonstrate that the Western section, at least, of the Chesapeake and Ohio Canal, can be executed for less than the one-third part of the estimate of the United States' Board of Internal Improvement.

This result is established by a reference to contracts recently made

* The lime employed in the construction of the Pennsylvania Canal, delivered at 11 cents per bushel, is actually made on the line of the Chesapeake and Ohio Canal, and transported to the other.

† A survey and estimate has recently been made by an experienced Engineer in New York, of a Canal to unite the Alleghany river in Pennsylvania, with the New York Canal, 102 miles in length, with an average of 13 feet of lockage per mile, which is estimated to cost 5,386 dollars per mile, while the Chesapeake and Ohio Canal, with an average of only 9½ feet of lockage, is estimated by the Board of Engineers to cost 64,516 dollars per mile, about eleven times the estimated cost of the other, with an average of one fourth less lockage per mile.

upon the spot, for similar work, yielding a handsome profit to the undertakers, and where the competition, instead of enhancing the price of labor, (according to the hypothesis of the Board,) has reduced it; so that the second contracts have been taken at from 10 to 20 per cent. less than the first.

4th. Could further proof in support of the views already presented by the Committee be required, they would refer to offers made in writing, by General Lacock, now a Commissioner on the Pennsylvania Canal, and David Shriver, Esq. late a member of the United States' Board of Internal Improvement, both practical engineers, and gentlemen of wealth and respectability, who proposed to make the canal from Cumberland to Georgetown, (186 miles) for 2½ million of dollars, or less than one-third of the estimate, viz: $8,177,028. This offer amounts to about $13,440, and the estimate to about $44,000 per mile. General Lacock has recently made an additional offer, to make *one hundred miles*, of the Western and middle sections, according to the plan and dimensions of the Pennsylvania Canal, for $1,000,000, being $10,000 per mile. This part of the canal is *estimated* by the Board in their report, at about $5,245,000, being $52,245 per mile, or more than *five* times the amount of General Lacock's offer, for the performance of which offer, he says he is prepared to give ample security. The Pennsylvania Canal is 40 feet wide, 4½ deep, with locks 90 feet long and 16 wide; while the Chesapeake and Ohio Canal is proposed to be made 48 feet wide, and 5 deep, with locks 104 feet long, and 14 wide. From a calculation made by competent Engineers, $2,000 per mile, it is believed, would suffice to defray the additional expense required to enlarge the dimensions of the Pennsylvania, to those proposed for the Chesapeake and Ohio Canal; which sum, added to the offer of General Lacock, would amount to only $12,000 per mile, or less than one *fourth part* of the estimate of the United States' Engineers: and from the high standing of the gentlemen making this offer, no reasonable doubt can be entertained, but that the work can and will be executed for this sum, should the offer be accepted; thus, 286 miles of the Canal, estimated at upwards of $ 13,400,000, will be completed, on the plan of the Pennsylvania Canal, for $ 3,500,000; or, on the plan proposed by the Board of Engineers, for about $ 4,072,000, being considerably less than one-third of their estimate, and leaving, on what they denominate the middle section, only fifty-five miles of Canal, or a portage of 22 miles to complete the entire route.

5th. The next corrective applied by the committee to the estimate of the Board is derived from the *prices* paid for labor and materials at the Capitol, by Mr. Elgar, the Superintendent of the Public Buildings.

At the Capitol, *Lime*, made at Thomaston, Maine, transferred 640 miles, 43 cents per bushel—Estimate of the Board of Internal Improvement 48, for the whole line—Difference 5 cents.

At the Capital, *Labor*, per day, (good hands) 75 cents—Estimate of the Board, 1 dollar, lowest rate—Difference 25 cents per day.

" *Masonry, Stone Wall*, with mortar of best materials and workmanship. $ 2,62½ per perch—Estimate of the Board, $ 5 38½—Difference, per perch, $ 2 76.

" **Dry Wall*, without mortar, stone from the Potomac, five miles, $ 1 87 per perch—Estimate of the Board, $ 3 72—Difference, $ 1 84.

" *Dry Wall*, stone on the spot, 75 cents per perch—Estimate of the Board, $ 2 77—Difference, $2 02.

" **Excavation*, per cubic yard of earth, transported 200 yards, (11 to 13 cts.) 12 cents per cubic yard—Estimate of the Board, 42 cents†—Difference 30 cents.

Thus it would appear, from the prices now paid at the Capitol, that the materials could be furnished, and the whole work executed in the Capitol yard, for a sum vastly short of the amount required by the estimate of the Board, to construct the canal through the interior of the country, where the materials are mostly on the spot, and labor and provisions are to be had at the lowest rates, and in the greatest abundance.

Thus, whether the estimated cost of the Chesapeake and Ohio Canal be tested by the actual cost of other canals now in progress, over similar ground in the same vicinity, or by the offers of responsible and experienced Engineers to execute the work, the same result is produced; that the work can be done for less than one third of its *estimated* cost. Or, if we compare the *prices* the Board have adopted as the basis of their estimate, with the prices now paid for similar work on

	Excavation.	Walling.	Total.
* On the Eastern section, - - -	$ 2,515,475	$ 2,737,808	$ 5,278,283
Middle do - - - -	2,797,489	3,184,723	5,982,212
Western do - - - -	1,800,213	712,444	2 512,457
	$ 7,113,177	$ 6,634,975	$ 13,768,152

In the Eastern Section, average co t per cubic yard of excavation, -	$00 26
walling - -	3 09
In Western Section, excavating, - - - - - - -	0 25
walling - - - - - - -	3 63
Middle Section, for excavation, per cubic yard, - - - -	58
walling - - - - - - -	5 23
For whole canal, average cost of excavation, - - - -	32
For walling, (exclusive of locks, bridges, aqueducts, culverts, &c.) -	3 93
or, per perch, of 25 cubic feet, - - - - -	3 64

† The Board estimate the cubic yard of earth, carried 40 yards, at 14 cents, to which they add 7 cents for every additional 40 yards, amounting, on 200 yards, to 42 cents the cubic yard.

the Ohio and Pennsylvania Canals, both East and West of the mountains; or if contrasted with the prices reported by the committees along the line of the canal, or with those adopted by this committee; still the results of all these comparisons concur in establishing the same general position, that the work can be contracted for and executed for *one-third part* of the estimated cost.

On a retrospect of the facts supplied to the Committee, and by them presented to the Convention, from so many and such various and respectable sources, the result of the comparison which they have enabled the committee to institute, between the cost of a canal of the dimensions recommended by the United States' Board of Internal Improvement, in conformity with the estimate of the Board, and the cost of the same canal at the reduced estimate of the committee, must be to the Convention, and will be to the public, a subject of no little surprise. It was alike so to the Committee, and constituted an additional motive for the vigilant exercise of that circumspection which the peculiar nature of their office required, as well as the delicate circumstances under which they have been called to act. They could not but be aware, that any conclusions at which they might arrive, would be regarded as those of the zealous friends of an enterprise of unparalleled magnitude and importance, to promote which the members of the Convention have themselves reassembled; that, if those conclusions differed materially, as they evidently do, from those of the very able and scientific report on which a resolution of the Convention required the Committee to found their estimate, they would have to encounter the weight of high professional authority, sustained by unimpeachable integrity, and enhanced in its influence by the absence of the slightest suspicion of any unworthy bias.

The Committee deem it, therefore, a cause of congratulation to the Convention, that the nature of their disagreement from the Board is so obvious, as to preclude a doubt of its origin; and that origin so simple in itself, as to be susceptible, wherever the error may lie, of the most certain and prompt corrective.

By resolving the prices of the various species of labor and materials, required for the construction of a canal, into their constituent elements, the Board afford an unerring guide to the application of this corrective; and, further, demonstrate that, if the Committee have arrived at results so different from their own, it is only because they have set out with such different facts. To the evidence, therefore, accompanying this report, of these facts, and to the facts themselves, the Committee confidently appeal, to sustain their deductions. In a branch of practical science, they refer to the decision of that experience which, and which only, is competent to determine the correctness of their estimates; and, from the judgment of this impartial and infallible arbiter, there can be no appeal to a higher authority.

But, in justice to the Board, it may not be amiss, and, to the Convention, it may prove satisfactory, yet farther to examine that analysis of prices from which the Board have derived their extraordinary estimate.

As, in all the work of a canal, except the construction of the locks, aqueducts, bridges, and culverts, but more especially in simple excavation, embankment, walling, and paving, which constitute so large a proportion of its entire cost, common labor, assisted with very little skill, is the chief, indeed almost the sole element of value, the Committee invite the attention of the Convention to this item of the estimate of the Board, as it is presented in their analysis. The Board here compute a month's labor at "22 effective days," out of thirty, the supposed duration of the month; its wages, at $12: it subsistence, at $ 8 57, or two dollars per week: being more than $ 106 27 for the year of 365 days: and, allowing for whiskey two cents the day, and for accidental lost time four cents, they raise the price of the effective day's labor to one dollar.

In this analysis each element is involved in error. Custom computes the month's labor at 26 effective working days; which, added to four sabbaths, make the nominal month of thirty days. The loss of time from ill health, rains, and accidents, befalling the laborer, is borne by him. His wages will be found to vary between six and ten dollars, averaging eight for the month; his subsistence, comprehending his whiskey, not to exceed four dollars, or five at most. The sum allowed for this last item, by the United States' Engineers, equals, if it does not exceed, the cost of board in some of the most expensive Universities and Colleges of the several States; and, in many of the best hotels and boarding houses in the largest towns of the several counties through which the intended canal will probably pass.

It is understood that the Board of Engineers have considered any possible over estimate of the *price* of a day's labor of 10 hours, employed in excavation, as made up by an excessive allowance for the *quantity* of work supposed to be done in the day. This would be deriving an apology, for one inaccuracy, by the admission of another, if the fact of the contract price of excavation per cubic yard had not, in various instances, brought experience to testify to the contrary.

Moreover, this excessive estimate is applied to all the other offices of ordinary labor, the lighest as well as the heaviest; not only to that of excavation, but to the attendance upon the masons; and, it is presumed, to the drivers of carts engaged in transportation. The allowance of a single horse, cart, and driver, being as much as 1,88 cents. In the excavation of the entire tunnel, twelve and a half per cent. is superadded to the dollar on account of the peculiar nature of the work; and yet the hands that labor in the coal pits, near Richmond, in Virginia, not only involved in darkness, but exposed to wet, become fond of their occupation on account of the moderate temperature to which it exposes them in the extremes of both Summer and Winter.

The Board, moreover, make no allowance, whatever, for cheapening the cost of excavation, by substituting the scraper and the plough,

dragged by horses or oxen, for the manual labor of the spade, the pick, and the shovel.

In the same analysis they compute the lowest cost of simple excavation, that of loosening and throwing into a cart or wheelbarrow the lightest earth, at six cents and eight-tenths of a cent per cubic yard; and yet, in their tables of prices, they have not extended one single cubic yard of excavated earth at less then 14 cents. They allow, it is true, for transportation, to the distance of 40 yards upon a level, or of 30 yards on an ascent of $\frac{1}{12}$th, 6.8 cents, or a sum equivalent to the cost of excavation; and a like amount for each additional stage of forty yards of like transportation; but it cannot be presumed that every shovelful of earth must be removed, for forty yards, in a cart or wheelbarrow; and, if so, the cost of such excavation should be 13.6 not 14 cents. That this is not an average price, the table of excavation, for the Eastern section of the Chesapeake and Ohio Canal, compiled by the Committee, demonstrates. The eleven tables of the Board, comprehended in this exhibit, comprise under the head of excavation, in the same columns of prices, no less then twenty-one different values, beginning with 14 cents, and ending at 1.60 cents the cubic yard. The table of the Committee demonstrates that 2,596,941.8 cubic yards of excavation, upon this section, are estimated at 14 cents each; and that, being the lowest estimated excavation, by a reference to the analysis, it must consequently be of "light earth, sand, and clay, or alluvial bottom;" much of it must be found on the extensive alluvial low grounds of the Potomac river, composed of soil capable, in part at least, of being pitched by the shovel upon the adjacent banks of the canal with the cast of the hand; and much, if not the whole, of being removed out of the way by the plough and the scraper; or, as has been practised on some of the canals of Europe, by wheelbarrows moving on inclined planes, guided by the hand, and drawn up by a single application of the power of horses.*

The excavation, alone, of so much of the Eastern section of the Chesapeake and Ohio Canal, as extends from Cumberland to Georgetown, is computed at $2,515,477 56, being an average of 25.8 cents per cubic yard, on 9,745,934.00 cubic yards. In the form in which the tables of the Board present this estimate, a comparison of this particular item of expense, with the same on other canals already finished, or in execution, is impracticable. An approximation only can be made to it by referring to the cost of labor, as a common standard. But, while it has been seen that the lowest estimate of the Board, on the Western section of the Canal, near Pittsburg, is at seven cents the cubic yard, augmented at the rate of 6.8 per cubic yard for every forty yards of additional transportation; and that the lowest estimate on

* One horse working on a level plane, between two posts, by a rope fastened at each extremity to the body of the wheelbarrow, and passing over a pulley, or through a block at each post, drawing the wheelbarrow alternately from the bottom of the Canal.

the Eastern section is 14 cents, subject to like augmentation, the contract prices of the excavation of the Eastern section of the new Pennsylvania Canal, following the margin of the Susquehannah, are, for the lighest excavation of earth of all kinds, 7¾ cents the cubic yard, and for the most heavy but 12½ cents; for that of slate-work, from 25 to 30 cents: of other rock, from 35 to 70. The last price being charged in but a single section, out of twenty-five consecutive sections; while, in all, the removal of the excavated material out of the line of the Canal, constitutes part of the charge of the excavation itself, and is included in the contract price. From this fact, apparent in the table of prices, transcribed from the Commissioners' office in Harrisburg, rock excavation is expected to occur in twenty-two of these sections, and, therefore, it is improbable that on those the plough and scraper could be applied to facilitate it.* In the estimate of the Board, the sum of $280,000 is allowed for excavation below Cumberland, at a cost for each cubic yard exceeding 60 cents; and more than $193,000 of that sum is for excavation; exceeding in cost one dollar the cubic yard. The excavation alone, of the 186 miles of the Eastern section of the Chesapeake and Ohio Canal, is computed by the Board, at more than two millions and a half of dollars, the price at which Messrs Lacock and Shriver offered to contract an entire canal of somewhat less dimensions; requiring, however, each expense, except that of excavation, to be very near the same. For the enlargement of the breadth of a canal involves, in a very incon siderable degree, as the Board have shown, (see the remarks of the Board on the last reported subdivision,) any other additional cost than of excavation, and, *under some circumstances*, where the canal passes along the face of a mountain, and much earth is required to embank and fill in at bottom, it is as easy, if not more so, to make a broad and deep canal than a shallow one.

The over estimate of labor, in the analysis of the Board, proportionably swells the charge for embankment, as has been already intimated. This is often nothing more than a particular application of the excavated earth and stone, after it is gathered upon the scraper, wheelbarrow, or cart.

It is, therefore, very difficult to separate the cost of *embankment* and *excavation*, till the line of a canal is precisely determined, the ground to be excavated marked out for contract, and the foundations for the embankments designated. A reference to the report of the Board, (see the second paragraph of the report,) as well as to a prior correspondence between the Chief of the Engineer Department and the Central Committee, shews that this has not been yet done, in relation to the Chesapeake and Ohio Canal. It may, therefore, be found, hereafter, and prior to the commencement of the Canal, that the cost of excavation supplies

* The dimensions of this Canal, between Swetara and Harrisburg, extend to the breadth of fifty feet, and depth of six feet; the greatest depth of the tide known in a Canal in America; the locks are required to be 95 feet long by 18 feet in width. The contract price of this Canal from Swetara to the Juniata, does not exceed, on an average, $10,000 the mile. (See a late essay of William Hollins, of Baltimore.)

the place of that of embankment, as was so frequently realized on the New York Canal, as to give enormous profits to those contractors who could avail themselves of this advantage.*

For this, as well as many other reasons, it is now universally admitted, that the Canals of New York, about to be constructed, could be made at twenty-five or even thirty per cent. less than their actual cost. And it is for this reason that the Committee have not sought to derive, from the experience of that State, any part of the basis of their estimates.

That of Pennsylvania will be seen, embodied in the table of a civil Engineer, at present in her service, and possessing her confidence.

A few month's practice is sufficient to acquire the little skill required for constructing dry walls without arches or openings; walls of great thickness, and requiring, generally, if not universally, but one smooth face, the cost of mere labor in the estimate of hauling, as well as paving, an operation yet more simple, would furnish a tolerably safe measure of value. But, inasmuch as transportation, or peculiar difficulties in quarrying stone, may be expected to augment the quantum of labor, it may not be improper to submit a few general remarks, applicable especially to the Eastern section of the Canal, on the known facilities attending both these operations along the Potomac.

The great abundance of excellent building stone, from the granite cliffs on the tide, to the various species of sandstone at Seneca, and above it, and of limestone and marble still higher up this river, constitutes one of the most striking features of the bordering country. The admirable quality of some of the species of this stone is manifested in the steps of the Eastern front and the pavement of the Rotundo and Portico of the Capitol.

There is *no point on this river* to which freestone, granite, or limestone, could not be *floated down* the stream at very little cost, where required, of a quality peculiarly adapted to the construction of locks or aqueducts. But stone, calculated for *walling* aud *paving*, is almost every where to be found, and exists no where in such abundance as where most needed, in the projecting cliffs of those hills and mountains whose ranges are penetrated, or bases are occasionally washed by the river.

It is in such situations, chiefly, that walls of massy strength are required, to resist a rapid current, swelled by freshets, threatening an abrasure of the banks or of the lining of the canal, and of such height as to keep out the river at its greatest rise. Much of the stone used for these purposes will be excavated from the canal: enough, in cases where the greatest consumption is required, will probably be obtained by heavy blasting on the overhanging or steep declivities, below which a base is to be formed in the river itself, for the bed and towing path of the canal.

* This fact is derived from the concurrent statement of several Representatives of that State.

Transportation, therefore, will rarely enter into the price of walling, or paving, or indeed of masonry, except where stone is needed of a particular quality for locks or aqueducts: and here it may always be effected, down stream, to points opposite and near to the works for which it is designed, at least throughout the entire Eastern section of the canal.

It is on 186 miles of this section, however, that the walling is computed at $2,737,808 68 cents, being about $88,000 the mile, of running measure, though the wall no where exceeds twenty-four feet in height, and is almost exclusively dry, or supposed to be constructed without mortar. The analysis of this estimate, allowing for walls erected of stone found on the spot, to the extent of 829,979 cubic yards, the sum of three dollars the cubic yard, or $2,489,937 in the total, is therefore the more extraordinary. In the contract just executed for the portion of the James River Canal, extending along the Balcony Falls and the base of the Blue ridge, in the counties of Amherst and Rockbridge, in Virginia, where six and a quarter miles of wall have been required on a line of but seven miles of canal, and this wall, seldom less than 15 feet, sometimes extends to 33 in height, $1 25 has been the price given in contracts which have been already, as regards the contractors, some, if not all, gentlemen of the highest moral worth, honorably, but very profitably executed. An application of this rate of reduction, would bring down this sum to much less than one moiety of the cost, at which it is charged, upon the Eastern section of the canal.

An analysis of the price of dry walling in the country adjacent to the canal, would furnish the following results: for walls of stone not squared, having its sharp angles hammered off, but not faced with rectangular surfaces: for quarrying, from 25 to 50 cents the cubic yard; for hauling any distance not exceeding a mile, from 6¼ to 62½ cents; for laying, after roughly dressing, from 25 to 50 cents;* for laying, where the stone was already excavated and lying on the side of the ridge, so as to dispense with hauling or removal, but for laying in the wall, the cost, by the cubic yard, would not exceed 50 cents; the mere laying in the wall, as it appears, actually costs but 40 cents on the Pennsylvania canals.

A table, prepared by a member of the Committee, computes the saving in the whole line of the canal, in this item, very near three millions of dollars, assuming the quantities of the Board and their description of the quality of the wall to be correct.

In the article of paving, to which almost any stone that will withstand the frost is applicable, it is believed that a proportionable reduction might be effected. By the gentleman referred to in the last note, this item is computed at less than a moiety of the sum charged by the Board.

* This analysis has been submitted to a member of the House of Representatives who was a contractor for the New York Canal, and by him approved.

Although in *Masonry* there is much skill required in determining the curvature of arches, and adjusting the pattern of each stone by reference to its peculiar place in the arch, yet, in quarrying the stone and preparing the cement of the wall or arch, according to the prescribed proportions of the materials of lime and sand which enter into its composition, ordinary labor is also the measure of value. Even in cutting the whole, or the far greater part of the stone, by the patterns provided by the artist, the necessary skill is easily and promptly acquired by the previously uninstructed laborer.

It is believed, therefore, that an analysis of the prices of masonry would lead to as great a reduction of the cost of that article, where it is of stone, as where the material is required to be hard burnt brick.

Before the Committee leave the Eastern section of the canal, it is incumbent on them to notice the subdivision of that section received from the Engineer Department since the recommitment of this report. By the charter of the Chesapeake and Ohio Canal Company, it is made an essential part of that section, and it still appears to be the only line of proposed canal that connects, without the intervention of any land carriage, the beds of mineral coal East of the Alleghany, with the town of Cumberland, to which this necessary article is now brought over land, not less, in any instance, than eight miles, at a cost, for transportation merely, which exceeds what would be an ample compensation, for its carriage by a canal, from the mouth of Savage to the District of Columbia.

If, therefore, expediency shall hereafter recommend the more Northern route proposed by the Board for the continued canal across the mountains, still, for the benefit of the coal trade, it may be wise to extend a canal from Cumberland to the mouth of Savage. The dam and feeders required above Cumberland, for the canal below, will reduce, in part, by backing the river up in a basin of eight miles, the cost of such extension; and the vast supplies of lumber, iron, and coal, which would be yielded by this subdivision, from the bordering mountains, would richly repay its cost. By bringing iron and coal, fit for coking and smelting, into the immediate vicinity of each other, and of constant still-water navigation, to the Atlantic, this branch, (should it be but one,) from the main canal, would multiply this essential material of all the arts, as it has been, in England since 1778, by the same causes. It becomes the duty, therefore, of the Committee, to turn their attention to the estimates, by the Board, of the cost of this subdivision, in order to fulfil the object of their appointment.

The length of this subdivision is 30 miles and 350 yards; its descent, divided among thirty-nine locks, 312 feet.

The Board have computed its cost at $1,794,903 86, of which the sum of $720,665 80 is allowed for walling, in quantities of 214,931 cubic yards, in distances, taken together, of but 8 miles and 1170 yards. The lowest excavation is charged at 17 cents the cubic yard; the total amount 1,036,618 cubic yards, at $339,441 46. Of the embankment, 562,040.80 cubic yards are charged at the gross sum of $113,257 60, the lowest estimate being 22 cents the cubic yard.

These charges, with $492,000 for lockage, make up the entire summary, exclusive of $62,277 for aqueducts; $14,200, for culverts and bridges: $31,722, for 265,980 cubic feet of puddling; $18,200, for 18 miles of fencing; and $1,000 for a waste gate and two waste weirs.

The far greater part of the walling, where stone eminently abounds, is charged at 4 dollars the cubic yard.

As the Board have distinctly reported that they found, on applying this calculation to the ground over which this subdivision will be conducted, "that a very trifling *decrease* of expense would be made by "decreasing, *materially*, the dimensions of the canal," it cannot be presumed, that the ground is here very unfavorable for that species of still water navigation. And the Board still farther add, "that the "unfavorable character of the river for a lock and dam navigation, "which was thought of as a substitute," for the continuation of the canal, "would have rendered this scheme almost as expensive," and, as they most truly subjoin, "*much inferior in usefulness to the inde-* "*pendent canal.*" (See the description of the subdivision between Cumberland and the mouth of Savage.)

If the same ratio of reduction be applied to this subdivision as to the eleven others, which make up the entire Eastern section, its cost will not exceed, at the utmost, seven hundred and fifty thousand dollars: nor the entire Eastern section of two hundred and sixteen miles, between Georgetown and Savage, four millions of dollars, though estimated by the Board at $9,971,984 91 cents, or very near ten millions of dollars.

The arguments already adduced by the Committee, prove that the portion of that section of the canal beyond the Western base of the Alleghany, could be constructed at one-third of the sum estimated by the Board; an argument founded on the actual cost of a similar canal along the Alleghany river, leading from a common point of both, up a neighboring river not more favorable for canal navigation than the Monongahela, does not furnish a more conclusive evidence of the enormous character of the estimates of the Board, than may be adduced, under the immediate eye of the Convention, from a comparison between the cost of the 2½ miles of the Eastern section, next to Georgetown, according to the estimate of the Board, and the cost of the same subdivision, according to the calculation of an experienced Civil Engineer, whose letter, stating the result of his examination of the ground, is subjoined.

He has, it will be seen, assured the Committee, with undoubting confidence, that one mile of this canal, next to Georgetown, having the dimensions required by the Board, where the ground is very rocky, precipitous, and uneven, could be constructed for 24,000 dollars, and the mile next below the locks and above the last, for 10,000. The distance being actually two and a half miles, and the uneven ground extending almost half way; this would make the cost of conducting the Canal to Georgetown, from the present locks, on the level of the present canal, or 37 feet above the tide, 42,500 dol-

lars, exclusive of any lockage. The United States' Board of Internal Improvement have, however, estimated the same work precisely at a sum exceeding 140,000 dollars, exclusive also of lockage, and of any allowance for the basin at Georgetown, which is separately computed at 10,842 dollars. (See the 11th subdivision of the report.)

Before the Committee enter upon the examination of the computed cost of the tunnel, in the estimate of the Board, they will premise, first, that water lime, not known to the public, nor to the Board, to exist near the line of the canal, when that estimate was made, is now procured at Pittsburg, from Beaver Creek, in Ohio, in great abundance, and of excellent quality, at 18 cents the bushel. It has, indeed, been found on the New York, the Pennsylvania, and the Ohio Canals, and it is believed that a discovery of it has never yet failed to be made on every long line of canal in the United States. But if required to be imported from an Atlantic city, for any part of the Eastern section of the canal, it may be had in Philadelphia, of superior quality, for from 25 to 35 cents the bushel. The effect of this reduction of the price of this species of cement, on the cost of the tunnel, will be very considerable; according to the estimate of the Board, near 200,000 dollars; and this is exclusive of the reduction, by more than one-half, of the cost of labor on this expensive work.

The charges of several other items of expense, indeed, are alike susceptible of great diminution.

The cost, for example, of the steam engines to be used in the working shafts descending along the side of the tunnel, furnishes another evidence of the defective sources on which the Board must have relied for their evidence of the cost of the work which they have estimated. By reference to the letter marked No. 17, in the Appendix to this Report, the Convention will perceive, that a steam engine, of ten horse power, can be purchased at Pittsburg, for one thousand dollars, while the Board have computed the price of one of the same power, at five times that sum. In this preparatory article of expense, taken singly, a saving will be effected of not less than $ 40,000; and the engines, it may be observed, will not be without their value when the work shall have been completed for which they are transported to the tunnel.

But it is, as has been noticed, on the price allowed for the bricks of the entire lining of the tunnel, that the greatest excess has been here committed. The Board admit that suitable clay can be had, and the bricks made, within 800 yards of the shafts, down which they are to be let into the tunnel. As the arching and excavation, where the former is at all necessary, must proceed cotemporaneouly, the buckets that take up the loosened earth and stone, will descend, when required, with the bricks. As the shafts are so multipled as to be, throughout, within 180 yards of each other, throughout the tunnel, the length of the transportation within it, will, in no case, exceed 90 yards. One dollar and twenty-seven cents, however, is allowed per 1000 for transporting the bricks to the place where they are required for use. But what is much more worthy of remark, while the dimensions of each brick is reduced below the ordinary size thirty-seven and a quarter per

cent, as much as five dollars per 1000. is allowed for their cost at the kiln. (See Report, page 32.) The Board seemed not to have considered that the proportion of hard bricks which a kiln of 100,000 will yield, when well burnt, where each brick contains 101¼ cubic inches of clay, cannot be a just measure of the number of hard bricks a kiln would yield, having in it the same number of bricks, each containing 64 cubic inches only, or being of the reduced size required by the Board. The Committee are assured that the proportions of hard burnt bricks yielded by a kiln of a given number, will vary with the quality of the clay; the size of the bricks; the quantity of fuel allowed, and the skill with which they are burnt, itself the result of experience. Coal will be found, in great abundance, immediately to the West of the tunnel; wood, every where above it; and by burning each kiln, after the first, at any yard, in a permanent case, the number of bricks unfit for use in the tunnel, will be, after a very little experience, found to be very few, much less than 40 in every hundred, the number rejected by the Board.

In proceeding in their examination of the cost of the proposed tunnel, the Committee are aware, that, in the United States at least, they can procure few facts to guide them. Even in Europe no tunnel, it is believed, has been constructed, having an incumbent mass of earth above it, exceeding, in any part of its course, eight hundred and fifty feet, although tunnels are as old in Italy as the reign of the Cæsars; and there are tunnels in France of modern construction, as long, and in England very nearly as long, as that described by the Board. The Engineer from whom many of the facts in this report have been obtained, is now superintending the excavation of a tunnel near Lebanon, in Pennsylvania; the cost of which, he reports, is fifty dollars the running yard; its dimensions 17 feet wide, and its height the same. Twelve men can work upon it at a time, and a single cart suffices to clear away the excavated materials. Peculiar difficulties, he reports to have been met in the excavation, from the mass to be penetrated being hard slate in lamina, having an unfavorable dip, and here and there interpersed with veins of silex, which, when encountered, turns the edge of the augers used in boring. A mile of such tunnel would cost $ 88.000. The Committee are not informed whether this sum includes arching where necessary. That the labor to be wrought within a tunnel, where safety from personal danger is assured, will not be unpleasant, or more expensive, the Committee are inclined to believe, for the reason already stated. Its operations will not be affected by intense heat or cold, or by any changes of weather. They may be, therefore, uninterrupted, and a double set of hands employed to hasten their completion, by night and day.

But may not some part of that labor be saved? The cost of excavation is computed as if the excavated mountain were sand stone rock. (See the Report of the Board.) Will it be necessary every where throughout the tunnel, to line its arches at top and bottom, as well as its sides, with brick? The Committee are not aware, that it is at all probable, that the bottom of such a tunnel would require lining, or

that arches through sand-stone rock, which the Board assumed to be the average quality of the mass to be penetrated, may not be found to dispense altogether with the artificial lining with brick. It would seem to be very unreasonable to charge the entire excavation, as of such rock, and yet, to provide a lining of brick throughout the entire tunnel of four miles. For ventilation merely, it has been ingeniously suggested, that boring with a six inch auger from the surface of the mountain to the summit of the tunnel, and tubing down, as is practised in the numerous Western salt works, with augers of smaller size, would amply suffice. Half the shafts might, therefore, be dispensed with, especially towards the interior of the tunnel, since the Committee are also apprised, that one mile of horizontal carriage, on a wooden railway or track, with carts and horses, is not more than equivalent in cost to a perpendicular lift of 400 feet.

Should the masonry prove indispensable, the Committee believe it may be confidently computed at one-half the cost assumed by the Board, and that every other item will admit of the like reduction; since the article of labor, which affects so sensibly that of excavation, as well as every other, is rated at $ 1 12½ the day. The Committee therefore believe, that the tunnel can be constructed at less than one half of $ 2,495,242 80, the computation of the Board, in which $ 1,892,000 is allowed for the masonry, and $ 473,124, being a dollar the cubic yard, for the mere excavation of the tunnel. Should its cost be computed at $ 1,250,000, then the Committee are assured, that its enlargement to a breadth sufficient to permit two canal boats to pass each other with ease, would not add more than one third to that expense. So that an enlarged tunnel, obviating every impediment to the ready passage of boats, may be computed at less than $ 1,700,000. This sum, the Committee believe, greatly exceeds the cost of any similar work in modern Europe, or America, making every allowance for difference of dimensions and improved construction.

If the part of the Western section of the canal, including the reservoirs, be completed before the tunnel is commenced, water carriage of all the necessary materials, of coal, iron, lime, and provisions, to the entrance of the tunnel itself, may be substituted for land carriage, and made to contribute to a reduction of its cost.

In this sentiment the Committee concur with the Board, that a precise and exact estimate cannot be made of the cost of the Chesapeake and Ohio Canal, until it is traced on the surface of the ground, for actual excavation. (See the 22d page of the Report.)

But the Committee trust they will be warranted, by the facts and deductions which they have now presented to the Convention, in stating it to be their confident opinion that the entire Canal cannot exceed, in actual cost, ten millions of dollars, even after it shall be extended as the Board proposes, to the entrance of Georgetown; after, by its various feeders, and its descending branches and locks, down to the navigable rivers, along whose margins it will be conducted, it shall have equalized the value of its channel, to the opposite shores; and after

it shall be extended in breadth, wherever practicable, to promote a diminution of the resistance of the water to the minimum of an indefinite expanse, or to sixty feet; a breadth which it should, at any rate, possess, between the last resort to the Potomac, above the Little Falls, and Georgetown; in order that, for all future uses authorized by the charter, there may exist an ample supply of water, without injury to the navigation of the main canal. This calculation the Committee venture to indulge, on the supposition that no great and unforeseen change shall occur in the circumstances of the United States, materially affecting the price of subsistence, and consequently the wages of labor.

Even in any such event, unexpected and improbable as it now appears, it should be remarked that the former has never been suddenly and greatly augmented in the country through which a great part of the canal will extend; and that, hitherto, all the experience of the United States demonstrates that the cost of labor, in canalling, has been continually declining, except where peculiar circumstances have co-operated to raise its price. The same contractors who constructed certain parts of the New York Canals, the popularity of which, in the country through which they passed was sustained in part, it has been intimated, by extraordinary allowances for every species of work, are now the contractors for portions of the Ohio Canals, and, having finished or partly executed these, have engaged in the structure of those very canals of Pennsylvania to which the Committee have appealed in justification of their estimates.

In answer to the suggestion, countenanced in some degree, by the Board, (see page 23 of Report,) that an increase of the price of materials and labor may be expected on the commencement of the canal, the committee maintain a position which they believe to be universal in its application, and incontrovertible; that, where the supply of every commodity is unlimited in extent, and there is an abundant capital to bring it forth in the market, an increase of demand for its use will always occasion a reduction of its price. They extend this principle to the cost of lime, bricks, and even labor, which last, in a population of twelve millions of people, who maintain an army on land of but six thousand men, and a few armed ships at sea, may be regarded as unlimited for every purpose of canalling or internal improvement. But this charge is, moreover, liable to be restrained from great and sudden augmentation, by a consideration peculiar to the greater part of a line of this canal: that its works are to be constructed, where, in any emergency, involuntary servitude might be called to their aid. The bare possibility of this, would prevent exorbitant demands for an increase of wages, or sudden combinations to raise the price of labor. Experience confirms the principle on which the Committee here found their reasoning. The advantage to be derived from the vicinity of the line of the Canal to Pennsylvania and Ohio, and to abundant supplies of skill and labor, should not here be overlooked.

In this great work no part of its actual cost need be swelled by an allowance of large "profits of stock." It is a part of the merit of

the plan of its execution, that, blending private with public interest, it not only may, but probably will be, let out for construction in small portions to contractors, supervised by experienced Civil Engineers. No favoritism will award the contracts; ample security will be exacted for their punctual fulfilment; and all special indulgences will be excluded in enforcing their faithful performance.

The contractors, themselves, in the first instance, will supply, by established character and credit, the little capital required by each, and they will work, not in the spirit of speculation, for large profits, but for small gains, such as have been realized by contented and laborious industry in the recent works of Ohio and Pennsylvania. Such gains bear but a small proportion to what those who adventure in extensive and hazardous speculations usually allow to their subordinate agents or overseers, or a Government dispenses in annual salaries to its officers of the lowest grade.

Experience in canalling, as in all other branches of experimental knowledge, is daily advancing. Every year new inventions supersede, in part, or greatly facilitate, the operations of manual labor, and calculations, such as the Committee have themselves founded, on bona fide contracts of recent date, or in transitu, will be regarded, hereafter, as alike extravagant with those which they have reviewed.

The following minutes of the cost of the Hudson and Delaware Canal were derived from the contracts for its execution in the office of Mr. Bolton, of the city of New York, the President of the Company:

"Breadth of the canal 32 feet at top, 20 feet at bottom, depth 4 feet.

"The date of the contracts is the 6th of December, 1825; the time limited for their execution, July 1st, 1827.

"*On two rocky sections*, 121 & 122. The embankment below the lock, on section 121, which shall be made from rock excavation, shall be counted as embankment, and not as excavation.

"For excavation, 10 cents; for embankment made from loose rock, or materials above the lock, 13 cents per cubic yard; and for embankment, made from rock and other materials, below the lock, 45 cents; for slope wall, made from stone and rock, below the lock, 75 cents; and for slope made above the lock and not blasted, 30 cents per cubic yard. But, it is expressly understood, that these prices are to include all necessary blasting of rocks to form the body of the canal. In general, the price of excavation varies between 7½ and 10 cents the cubic yard; embankment, from 5 to 12½ cents. All earth necessarily excavated under or between the banks, shall be estimated as excavation; and in all cases where the earth necessarily excavated is not to be removed more than one hundred feet to form the adjoining bank, or banks, no estimate for embankment shall be made.

"For all turnpike bridges, or bridges to accommodate great travelled roads, as they shall be designated by the Engineers, 155 dollars each. For all farm bridges erected by the contractors, 85 dollars.

"The above price is to include excavation for the foundation of the abutments, so far as is absolutely necessary, after the canal is excavated to its regular shape and form. The Engineer to be the judge of the materials and workmanship, and whatever he shall decide and determine, in regard to the quality of materials and workmanship, shall be conclusive. And, should he determine that a bridge is badly constructed and requires to be pulled down and re-built, it shall be done at the cost and charge of the contractor.

"All turnpike bridges shall average 120 perches of stone masonry, and farm bridges 60 perches. If more is required, it shall be paid for at the rate of 87½ cents the perch. If less, it shall be deducted in the same ratio of price.

"To be finished off in a crowning or curved manner, with a coping of large and well shaped stones. The wing walls shall be quarter circles, except in cases where the bridge crosses the canal diagonally, in which case one wing may be reduced, and the other extended in such manner as may be required to support the bridge, embankment, or road-way. On the towing-path side, the radius of the face of the wing walls, 8 feet; and the radius of banking, 12 feet. On the side opposite the towing-path, the radius of face 12 feet, and the radius of backing 16 feet.

"Stone, of good quality, laid dry, and pointed with good mortar of quick lime, and sand in proper proportions.

"*Culverts*—Materials, form, dimensions, and mode of construction, to be according to the discretion of the Engineer. His estimate and decision to be final between the parties.

"For all timber and plank furnished and laid in the foundations, and all plank for sheet piling, drove or placed down to secure foundations; and all plank, or guard sheeting, placed around and well united to the masonry of the walls, at the rate of $10 per 1000 feet, board measure.

"For all stone masonry, laid up as required by contract, in the best quality of water cement, faithfully executed, for the construction of abutments, wing walls, and heading, at the rate of $2 75 per perch of 16½ cubic feet. And for all arches of 3 feet span and 9 inches deep, and, also, all arches of more than 3, and not exceeding 8 feet span, which are to be 1 foot deep, at the rate of $3 50 per perch.

"Locks of stone, the sum of $390 per foot lift.

"The walls to be 100 feet long, and to average 7 feet including the buttresses, and 76 feet between the gates—the chamber to be 9 feet wide in the clear.

"To sustain a bank against a river striking it at right angles, and then running with it, 30 cents per cubic yard for a slope wall.

"Some half miles of the canal cost but $1400; a single one, only, as much as $9,847; and this, No. 521, combines difficulties of every form—a quicksand laying on shelving rocks, avalanches, and river floods to guard against."

The preceding minutes were found, after being mislaid, too late to be submitted to the Convention.

The tolls of the New York canals amounted in the last year to very near seven hundred thousand dollars: their cost has exceeded ten millions, including the interest on the capital borrowed to construct them. Subsequent experience, and the authority of the most intelligent Engineers, warrants the belief that they could now be constructed for two thirds of their original cost. The excess of their tolls, so far beyond the most sanguine anticipations of their early patrons, will be manifested by the subjoined extract from the memoir of Cadwallader D. Colden, Esq., published along with the narrative of the celebration of the completion of that great work.

"The Canals not having been completed when the Commissioners made their last report, there are not, now, documents before the public, which will show precisely what has been the cost of these works. There are, however, data, which will enable us to ascertain the amount very nearly. In the annual report of the Commissioners of the Canal Fund, made in 1825, they state, that all the moneys paid for the Canals up to the 1st of January of that year, after deducting the tolls received, amounted to 8,829,015 dollars: and, according to the last report of the Canal Commissioners, it then required, to complete the Canals and to satisfy all claims for damages, 800,000 dollars. These sums, added together, amount to 10,120,465 dollars, which may be taken as the whole amount which has been disbursed on account of the canals. The Erie Canal is 363 miles in length, and on the Champlain route there are 18 miles of canal. The extent of canalling, therefore, is 381 miles, which gives an average of 26,241 dollars a mile."

"But there are connected with the Champlain canal, 46 miles of improved navigation in the Hudson and in Wood creek. The expense of these improvements has been very great: so that in estimating the cost of the canals per mile, these 46 miles ought to be taken into the calculation. This makes the whole length 427 miles, and the cost per mile 23,420 dollars."

"But, it must be recollected, that when the question is, how much the canals have actually cost the State, they must have credit for the amount of the tolls they have yielded."

"The last mentioned report of the Canal Commissioners states, that, from the opening of the navigation, in the Spring of 1824, till it was closed by the Winter, late in December of the same year, although only 280 miles of the Erie Canal were navigable, and 'although the regions West of Buffalo had hardly began to pay their contributions to the Western Canal, amounted to 350,761 dollars. The commissioners calculate that the tolls for the present year (1825) will amount to 500,000 dollars; and that, for the nine years succeeding January, 1826, they will increase, at an average of 75,000 dollars a year; and will,' at the expiration of ten years 'leave the State in the receipt of a clear, unincumbered revenue, from the Canal Fund, of more than a million and a half of dollars."

"The commissioners say, that their calculations as to the receipt

of tolls for the time to come, have been estimated so much within the probable proceeds, that they presume no contingency can take place, which will reduce the aggregate amount of the Canal fund, at the end of ten years, below the sum specified. There is the more confidence due to their estimate, because it is certainly true as they remark, that hitherto their anticipations, in reference to the receipt of tolls, have uniformly fallen short of the reality."

Note 16.

It will be seen, in classing the subjects, which have yielded the largest portion of the tolls of the New York canals, that lumber constitutes one of the most productive. The transportation of salt will not be peculiar to the Erie Canal. It is found on the Youghiogeny, near the line of the Chesapeake and Ohio Canal, and 570,000 bushels, from the vicinity of the Alleghany river, were brought to Pittsburg in the last year, at a price, which, were the Chesapeake and Ohio Canal completed, would enable this necessary manufacture to compete successfully, in the markets of the Chesapeake, with foreign salt, and finally, to exclude the latter altogether from the entire country, opened along the canal and its lateral rivers, now navigable above tide water, for five hundred miles into the interior.

The fisheries of the Potomac annually furnish, for foreign and domestic consumption, about 400,000 barrels of herrings and shad. Salt constitutes a large part of the value of this supply, about one bushel being allowed to each barrel of fish. The reduction of the price of salt, and the extension of the market for fish, which would result from the completion of the Chesapeake and Ohio Canal, would probably double this consumption in a few years. No apprehension need arise of the exhaustion of the natural stock of this article: for herrings are now used as manure near the shores of the Potomac.

Note 17.

It is on the supply of mineral coal that the committee chiefly rely, in indulging confident expectation of very great profit in the stock of the Chesapeake and Ohio Canal Company. Sufficient space is not allowed, in a report already too far extended, to manifest all the grounds of this confidence. They are derived from a comparison of the well known quality of the Potomac coal, with that which is furnished by the other rivers of the United States; from the comparative facilities of reaching the elevated banks which supply it, by the canal boats, and from a consideration of the various and multiplied uses, to which it is applicable.

If the District of Columbia, the States of Maryland and Virginia, the river Potomac, or the shores of the Chesapeake, shall, hereafter rear a city of but secondary rank, or all their cities together shall be equivalent to but one such emporium of arts and commerce: if this emporium shall not surpass the single city of Glasgow, in Scotland, the future profit accruing to the Chesapeake and Ohio Company from coal alone, will reach the *maximum* income, limited by its charter, as the following extract from a work of unquestioned authority will clearly demonstrate.

"In the suburbs of Glasgow, there are *eighteen collieries*, containing 58 engines, amounting in all to 1,411 horse power.

"Taking the average of three years, ending the 31st of December, 1824, *exclusive of what came from the suburbs*, 1,690,658 tons of coal were brought annually, to Glasgow, by the Monkland Canal." The tonnage of this canal, at three cents toll a bushel, for its coal, would amount to $ 1,420,148 43, or near a million and a half of dollars.

On the 11th of April, 1825, there were in Glasgow 176 engines used in manufactures, amounting, in whole, to 2,970 horse power, average of engines $16\frac{275}{1000}$ horse power.

"The first boat propelled by steam, in Europe, was made in Glasgow. It began to ply on the Clyde, in January, 1812. On the 11th of April, 1825, there were 53 steam boats plying on the Clyde, containing 68 engines, amounting to 1,936 horse power." Total steam power, viz: engines in Glasgow and on the river Clyde, 244, equivalent to the power of 4,906 horses.

"The population of Glasgow, in 1801, was 83,769; in 1821, 147,043. The population of the suburb parishes of Barony and Gorbals, are included in these estimates. The Royalty alone contained, in the last year, 72,765 souls."*

Throughout Great Britain coal is found, not on the sides of mountains, as along the Potomac, but beneath, and sometimes very far below the general surface of the country, as on James river in Virginia. It is, consequently, brought to the surface there, by the application of great power, and at heavy cost. Almost as much labor is exerted in pumping water, from the mine, and in raising the rock and earth loosened in excavation, as in elevating the coal to the aperture of the mine; and the health of the laborers, immured in sulphurous and damp pits, while getting it, is exposed to a danger, which will not be encountered on the banks of the Potomac. Some estimate of this advantage of the Potomac coal mines, over coal pits, so circumstanced, may be formed, from the fact, that the bushel of coal now costs at the summit of the shafts, sunk near the James river, considerably more, than the computed expense of raising and transporting it to the markets of the Potomac, exclusive of toll. Every branch of American manufacture is destined, hereafter, to experience this advantage, in a competition with Great Britain, for the supply, not only of American

* Sinclair's Analysis of the Statistical Account of Scotland.

consumption, but of that of all other nations. Great Britain owes her superiority, in manufactures, eminently, to her abundant mines of this valuable mineral, and that nation, which shall hereafter obtain it, on the cheapest terms, all other circumstances being alike, must surpass her in the mechanic arts, as she has hitherto done the rest of the world.

Prices of Coal in Philadelphia, from 1818 *to* 1825 *inclusive.*

1818.	Foreign coal, Liverpool, -	30 cents per bushel.
	Do New Castle, -	35
	Virginia, - - -	31
	Pennsylvania, - - -	50
1819.	The same, of the whole.	
1820.	The same, excepting Pennsylvania,	30
1821.	Foreign coal, - - -	30 *a* 35
	Virginia, - . -	28 *a* 30
	Pennsylvania, - - -	30 *a* 35
1822.	Do - - -	" "
	Foreign, - - -	28 *a* 35
1823.	Do - - -	30 *a* 33
	Virginia, - - -	25 *a* 28
	Pennsylvania, - - -	25 *a* 30
1824.	Do - - -	23 *a* 35
	Virginia, - - -	20 *a* 28
	Foreign, - - -	30 *a* 33
1825.	The same as 1824.	

Owing to the season being far advanced, when the Schuylkill navigation was completed, and the dryness of the season, there was less Pennsylvania coal brought to market than was expected. The price has of course risen since the beginning of Winter. The general expectation is, however, that there will be a plentiful supply next Summer and Fall, from the Lehigh and Schuylkill mines, and that the price will not exceed 20 cents per bushel, or $ 5 60 per ton, of 28 bushels.

The preceding table and statement was supplied to the Central Committee of the Chesapeake and Ohio Canal, by a member of the Senate of Pennsylvania.

The price of coals on the James river, and the cost of Virginia and Pennsylvania coal for a series of years, in Washington, will be found in the annexed information from a resident merchant of Washington, and a dealer in that commodity.

"*Estimate of the prices at which the Virginia Coal, brought from Richmond, has been sold at for the last five years past, from* 1821 *to* 1826.

"Price of Coal in Richmond, in 1821, from 14 to 20 cents per bushel of 4 pecks; depending entirely upon quality. The Coal on the

South side of James river, has generally been esteemed the best, and has generally commanded from 4 to 6 cents per bushel more than that on the North side.

"The same coals have generally been sold in this market at from 25 to 33 cents per bushel, agreeable to the standard measurement of this District, which is about 10 or 12 per cent. more than that in Richmond.

"Since my residence in this city, which has been for the last five years, there has been but little or no fluctuation in the above prices; and if any, they have been gradually declining; owing, I think, in the main, to wood having been sold within the last few years, cheaper than formerly, and in some measure to the introduction of the Lehigh and Susquehannah Stone Coal having been introduced here within the last two years, which is preferred by some people. There has also been, within the last two years, from 10 to 12,000 bushels or more of the pit coal brought from Cumberland on the Potomac, to this place, which, I think, in point of quality, superior to any pit coal I ever saw, and it has sold at from 28 to 30 cents per bushel by this measurement. The Lehigh and Susquehannah Coal, which is a hard Stone Coal, sells for $8 to $9 per ton, equal to 28 bushels to the ton. The estimate generally made of the consumption of Coal for a fire place for the Winter, is 50 bushels. I would myself consider 75 bushels not too much for the season in this climate, when fire would be at least agreeable, if not necessary.

"*Washington City, 24th May,* 1826."

When the boats of the Chesapeake and Ohio Canal shall reach the coal banks on the Potomac, it is believed that the coals can be put on board at one cent a bushel, which is more than the price, now paid, for loading the coal wagons at the banks, near Pittsburg.

From the enlarged dimensions of the Chesapeake and Ohio Canal, designed, as has been seen, in a former note, to give to the boats the advantage of floating on an indefinite expanse of water, the freight cannot be computed at more than four, or, at most, five cents the bushel. The tolls charged on this commodity in the early operations of the Canal, will be required to be large, in order to yield a sufficient income upon the stock of the canal: they will, of course, be reduced, when the resources of the country, through which the canal passes, and the territories which it is designed to unite, shall be fully developed. If the toll for the first years be computed at 6¼ cents the bushel, then the price of the commodity in the District of Columbia will be 12½ cents, exclusive of the mercantile profit of the dealer, which may make it fourteen cents.

On various parts of the line of the Canal, it will be much lower. At Pittsburg, coal is delivered into the cellars of the houses of the inhabitants, after transportation from the neighboring mines, distant from one to five miles, at three cents the bushel.

The heat supplied by the Pittsburg coal, to that of wood, is deemed to be in the ratio of seventeen bushels to a cord of dry hickory. The

specific gravity of the coal of Pittsburg is heavier than that of Liverpool. "In a manufactory at the former, 3000 spindles are moved during the day of 12 running hours, equivalent to 13¼ hours, with 60 bushels of coal, which, at the same time, warms the houses and factories. By the arks, or rude boats, which descend the Ohio and never return, it is delivered at Louisville, after a voyage of 550 miles, accelerated by the freshes of the Spring and Autumn, for from six to eight cents the bushel."

The price of coal at the great manufacturing town of Manchester, in England, is 3½ pence sterling. (equivalent to about 6⅓ cents, when reduced to American currency at par,) the bushel, of six score, or 120 lbs. weight, which is equal to one and a half of Pennsylvania. The price of coal at Manchester is, therefore, near fifty per cent. higher than at Pittsburg. At Liverpool it is still higher. At the coal banks upon the Potomac, it will be as cheap as at those near Pittsburg, where it is put in the wagon at less than a cent a bushel. Coal is now delivered at the manufactories of Zanesville, on the Muskingum, at 2½ cents the bushel. In a manufactory of window glass in that town, seventy thousand bushels are annually consumed at that cost.

New Jersey and New York are both looking to Pennsylvania for a supply of this mineral. The former expects to obtain it by a canal from the mouth of the Lehigh: the latter by the Hudson and Delaware Canal.

The following extract of a letter, dated Philadelphia, January 28, 1826, from a gentleman extensively engaged in the coal trade of Philadelphia, furnishes valuable information upon this subject:

"I have great pleasure in answering the queries submitted by you respecting the coal trade; my observations, you will observe, apply only to the mines at the head of the Schuylkill, and the improvements on that river; not having it in my power to give you information as to any other.

The works are in extent about 108 miles, commencing at the Lancaster Schuylkill bridge, and ending at Mount Carbon, of which 62 miles are by canals, and 46 by pools in the river. The number of houses for lock keepers is 65, the number of locks below Reading 39, and above Reading 81, being in the whole 120; of which 28 are guard locks, overcoming a fall of 588 feet; deducting the 28 guard locks, leave 92, which give an average of about 6 feet 5 inches lift to each lock; they are 17 feet by 75, and the time required in passing a loaded boat, is from 6 to 8 minutes.

The cost of the coal on board the boats is a difficult question precisely to answer, the situation of the bed or vein, its thickness, the purity of it, whether intermixed with veins of slate and dirt, whether taken out by a drift or shaft, whether troubled with water, &c. &c. are matters that are to be taken into consideration. As far as my experience goes, I think that from two to four cents is the cost of raising it to the pit's mouth. No improvement whatever has yet been made in transporting it to the landing, the common two horse wagons of the country, carrying about 30 bushels, are still in use; the present

expense of hauling may be estimated at one cent per bushel per mile. Suppose then the coal to be raised at an average of three cents from a mine, two miles from the landing, it may be delivered on board the boats for five cents per bushel.

In consequence of the small number of boats on the canal during the last season, and the great demand for them, we were obliged to pay as high as seven cents per bushel, freight, from Mount Carbon. The toll is six cents, or $ 1 68 per ton of 28 bushels. The cost of delivering it in Philadelphia the last year, may therefore be estimated as follows:

At the pit's mouth, - - -	3 cents per bushel.
Hauling two miles, - - -	2
Freight, - - - -	7
Toll, - - - -	6
Interest on cost of land and capital employed, salary to agent, &c. &c. at least, - - - -	2
	20 cents.

When the business is carried on by companies or individuals possessing large capitals, (which no doubt will be the case,) and with all the advantages of rail roads, steam engines for raising the water, wagons particularly calculated for the purpose, and other improvements in use in the collieries in England, it will of course be delivered at a much cheaper rate. It is supposed that, when the tow paths are complete, and those engaged in navigating the boats more experienced, that the freight will not be more than 4 cents; last season, in consequence of the tow paths not being finished, it required fourteen days for a boat to come down and return; hereafter it may be done in eight or nine. From present experience, flat bottom boats, carrying about 25 tons, or 700 bushels, 8 to 9 feet beam, 60 feet long, and drawing, when loaded, about 2 feet 6 inches, are preferred; two men, a boy, and a horse, are required to navigate them, and 'it is a fact worthy of notice, that a horse towing a boat, will with greater ease, go at the rate of four miles an hour in a pool, than three miles in a canal.'

The veins of coal in Schuylkill county, with but few exceptions, dip nearly North and South, at an angle of forty-five, or thereabouts, and run about E. N. E. and W. S. W. they vary in thickness, but generally are from four to six feet, many are found less, and some of ten and eleven feet thickness, if less than four, they are not considered profitable to work; a stratum of slate is always found above and below the coal. A few veins are found near the head of navigation, but the larger and more valuable lie at a distance of from one and a-half to four miles.

Philadelphia, January 28th, 1826.

P. S. The price of coal last season, was $ 7 33 per ton, until the month of December, when owing to a short supply, it was sold as high as $ 10 50."

The subjoined table "Of the Comparative Heights and Distances of the principal Districts of Anthracite Coal in Pennsylvania to market," is from the last report (of Dec. 1826,) of the Engineers of the Lehigh Coal and Navigation Company.

Several of the communications delineated below, are by a mixed navigation of canals and rivers, and some of them are exposed to the hazards of the Chesapeake Bay.

The Chesapeake and Ohio Canal, it is now ascertained, can be extended to Baltimore, so as to furnish a uniform line of canal navigation from the coal banks to that city.

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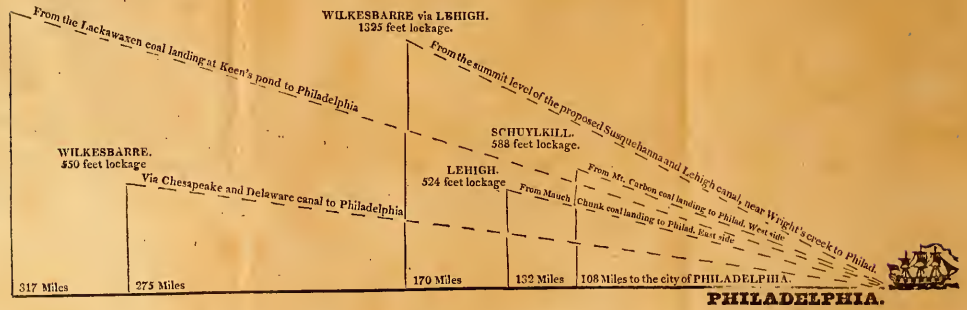
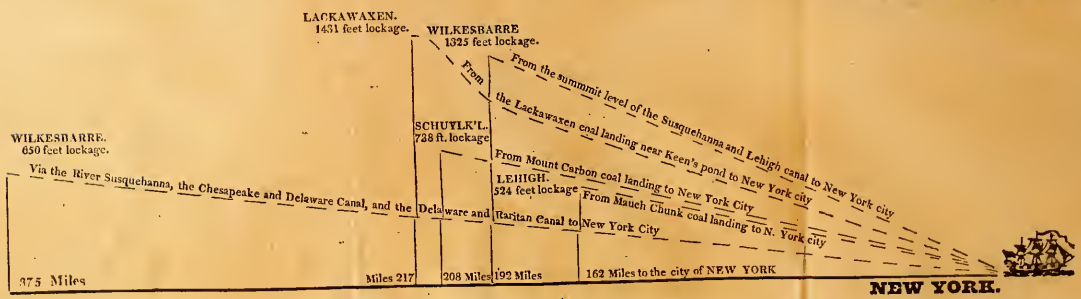
The Chesapeake and Ohio Canal, it is now ascertained, can be extended to Baltimore, so as to furnish a uniform line of canal navigation from the coal banks to that city.

DRAFTS

Of the Comparative Heights and Distances of the principal Districts of Anthracite Coal, in Pennsylvania, to Market.





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Sundry Canal reports suggest a commentary on the preceding table illustrating the distances of the Northern coal mines from their nearest markets.

New York is known to rely, at present, for a supply of coal to her great emporium, on the mines of the Hudson, and the country on the margin of her canals on the Luckawaxen mines in Pennsylvania, while the Schuylkill and Delaware are expected to supply the wants of Philadelphia from Mount Carbon and Mauch Chunk.

The Legislature of New York has guarantied the credit of the Hudson and Delaware Canal Company to the extent of half a million of dollars, with a view to the first object. One hundred miles above the city of New York, and fifty miles below Albany, this canal leaves the Hudson, and passing through a part of New York and Jersey, along the Walkill, the Rendout, and the Never Sink, it enters the Delaware, sixty-seven miles from the Hudson, and seventeen miles below the mouth of the Lackawaxen. In reaching the Delaware, the canal overcomes a rise and fall of 634 feet. To extend this canal to the mouth of the Lackawaxen, a rise of 148 feet must be overcome in seventeen miles, and to conduct it along this stream to within four or five miles of the coal mines, near its source, will require another canal of thirty-six miles, overcoming a fall of 668 feet. The lockage to be conreaches in the whole route is 1440, or by the report of Mr. Mills, 4431 feet, and the estimated distance from the Hudson to within four or five miles of the mines 117 miles. Making, from the city of New York, a mixed navigation of 219 miles, and a land carriage of four miles. The canal, which is nearly completed, as far as the Delaware, is but 32 feet wide and four feet deep, and its locks adapted to boats of five and twenty or thirty tons.

The following comparison between this line of navigation and that on which the Lehigh Company rely for the supply of coal to Philadelphia from Mauch Chunk, is from the pen of a Civil Engineer of Massachusetts, Mr. John L. Sullivan.

"The Lehigh Company appear to have an advantage in possessing both the navigation and the coal, but with the disadvantage of a descending navigation only, requiring a continual expense of arks; this therefore may be adduced as a reason why their coal cannot be afforded much, if any, lower. For you will find it stated in the New Jersey Canal Commissioners' Report, that coal at Easton, (the mouth of the Lehigh) will cost four dollars and sixty cents per ton, which they estimate, may therefore be delivered to the manufactories at six dollars and forty cents. But as Easton is ninety miles from Philadelphia by water, and 200 feet above the tide, this part of the navigation which is double the length of the Lehigh, is to be added to that sum, together with the charges and profits at Philadelphia."

The same Engineer, in a comparison between the advantages of the Hudson and Delaware Canal, for the supply of New York and those of the Schuylkill navigation, for the supply of Philadelphia with coal, says "the coal on the head-waters of the Schuylkill is situated nearly as far from Philadelphia as that of the Lackawaxen from the

Hudson." The proprietors are, by law, entitled to a toll of nineteen cents per bushel, which is five dollars and thirty-two cents per ton. But it is not intended, at present, to exact more than eight cents per bushel, or two dollars and twenty-four cents per ton; "yet, it can scarcelybe expected that the navigation company will not assess as much toll upon the principal article, as may be requisite to give a good interest on the investment, not being as a corporation, the owners of the coal, nor permitted to trade therein."

On a comparison of all these lines of internal navigation with that contemplated between Georgetown and the Coal Banks of the Potomac, the uniformity throughout of the navigation, upon a canal of very enlarged dimensions, and moderate lockage, added to the fact that the canal will enter the coal mines, must give a decided advantage to the Chesapeake and Ohio Canal.

Note 18.

When the forests of a country have been thinned or exhausted by the various uses to which wood is applicable, the cost of the manufacture of both lime and iron depends on the price of other fuel or mineral coal, if to be had at all.

Russia has been sometimes induced to prohibit or suspend the exportation of timber, for the sake of her iron manufacture, to the serious injury, and, indeed, almost total ruin of a part of her subjects. Ireland, which early manufactured iron, at one time ceased to do so, because its forests would no longer supply necessary fuel. The quantity of iron annually supplied by the English mines, was, after the middle of the last century, reduced, from the same cause, to but 28,000 tons, when Dudley discovered that it could be smelted by the substitution of coked coal for common charcoal. In consequence of this discovery, the annual production of iron in Great Britain had risen, in 1803, to 300,000 tons. Such will be the result in America, of pushing internal navigation from the Atlantic to the bases of those mountains that supply, in the same neighborhood, iron ore and mineral coal. The foreign importation of this necessary commodity will then cease, and an immense stock arise for exportation on terms cheaper than any other country now known can supply it to the world.

Pit coal, freed, by coking, from its bitumen, and made to resemble, as nearly as possible, the charcoal of wood, is consequently diminished in gravity. Coke is, therefore, transported in great quantity on the British canals, and is applied to various uses as well as to the smelting of iron ore, for which it is so extensively employed that it may be said to be the basis of the British iron works. The bitumen which is separated in a fluid form in this process of coking defrays its cost, and is applicable to many of the uses of vegetable tar. England, however, continues to import into New Castle and Hull large quantities of Swedish iron for the manufacture of steel, and especially of that species

which, being anciently used to make sheep shears, is called shear-steel, in her manufactures.

Iron has not been found in any considerable quantity on the Erie Canal of New York. It is manufactured in the high lands on the Hudson, and procured from Lake Champlain of excellent quality, by the Northern canal. It abounds, in every quality, on the Potomac, in the vicinity of the Coal Banks, and on the navigable streams of Virginia, which empty their waters into that river. The flux, essential to the manufacture of the crude ore, is abundantly supplied by lime stone and other minerals in the vicinity of the ore banks.

The mountains which seem to impede the progress of the Chesapeake and Ohio Canal will, therefore, become the fruitful source of its income; which must surpass that of any canal which yields neither coal nor iron.

Note 19.

New York has regarded it as fortunate that she did not succeed when she applied to the Congress of the United States, to aid her in the construction of a work which bears such honorable testimony to her enterprise and her resources. Uniting her two canals in one scheme of internal improvement, she conciliated towards them, though not without difficulty, the interests and feelings of a majority of her citizens.

The interests which sustain the Chesapeake and Ohio Canal are divided between many States, and preponderate in the councils of none. Rivalships every where oppose the appropriations to this truly national work, and force it to look to the nation for aid.

But the application of New York, when urged with great ability by several of her most distinguished citizens, was not, in truth, rejected; and, had the continuance of peace permitted its renewal, it must ultimately have succeeded.

Note 20.

When the single fact presented by the coal trade of Glasgow is duly considered, for the amount of near seventeen hundred thousand tons is exclusive of the supply of eighteen collieries in the suburbs which do not use the Monkland canal, when added to this it is considered that through a single county remote from this city, that of Lancashire, in Great Britain, one million of tons is transported, there is nothing extravagant in this sentiment. The time will doubtless arrive in America when iron rail roads will be required, not to supersede, but to aid canals, as in England, in transporting the produce of an Empire, to which Great Britain bears a smaller proportion, than Europe to the habitable globe.

NOTE 21.

The Committee regard the subscription invited from the United States as a loan of credit rather than an appropriation of money to the extent of the sum subscribed.

If the canal be extended to the coal banks, in five years from its commencement, and the estimates of this report come only near their anticipated results, the stock of the canal will be then above par. In the interim, should a loan be effected at 5 per cent to the extent of the United States' subscription, and in the annual instalments proposed of half a million each a year, the actual appropriation of the first year need be but the interest upon $500,000, or the sum of twenty-five thousand dollars, of the second but twice, and of the fifth year of but five times that amount, being for the highest sum of interest nearly, in amount, the annual appropriation for some years past to the completion of the public edifices in Washington, and this, on a supposition that no tolls are received before the entire completion of the Eastern section of the canal.

NOTE 22.

The highest amount of the annual interest chargeable upon the two and a half millions which the Government is invited to subscribe, being at five per cent., $125,000, if the total exports of the United States be increased but half a million of dollars, by the Eastern section of the Chesapeake and Ohio Canal, and the average duty on the return cargoes of twenty-five per cent. be levied on a value but equivalent to the outward cargoes, according to the very narrowest view of this measure, the Government will not be a loser should it never realize the profit of a single dollar on its shares of subscribed stock. In cheapening the transit of timber to the Navy Yard, of fuel for all its uses and those of the public edifices in Washington, to say nothing of the supply of water from the canal itself, for commodious docks, and other naval purposes, a profit not less than this might safely be added to those which it must derive from its character of a proprietor interested in this great work, exclusive of all regard for its character, the rights and obligations of a sovereign invested with both federal and local authority over the property and people of the District of Columbia.

A Bill to amend and explain an act, entitled "An act confirming an act of the Legislature of Virginia, incorporating the Chesapeake and Ohio Canal Company, and an act of the State of Maryland, for the same purpose."

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the assent already given by the United States to the Charter of the Chesapeake and

Ohio Canal Company, by an act of Congress, entitled An act confirming an act of the Legislature of Virginia, entitled an act incorporating the Chesapeake and Ohio Canal Company, and an act of the State of Maryland confirming the same, shall not be impaired by any change of the route of the said Canal, from or above the town of Cumberland, on the river Potomac, or the distribution thereof into two or more sections, at any time hereafter, or any change in the dimensions of that part of the present Eastern section, extending from Cumberland, or the mouth of Wills' creek, to the mouth of Savage, at the base of the Alleghany, or any substitution which the interest of the Chesapeake and Ohio Canal Company may, in the opinion of the Company, require to be made, of inclined planes, rail ways, or an artificial for a continued Canal, through the Allegany mountain, in any route, which may be by the Company finally adopted therefor between the town of Cumberland and the river Ohio.

SEC. 2. *And be it further enacted*, That, to obviate any possible ambiguity that might arise in the construction of the second section of the act of Congress aforesaid, by that act designed to be given to the States of Maryland and Virginia, or to any company incorporated by either or both of those States to extend a branch from the said Canal, or to prolong the same from the termination thereof by a continuous canal, within or through the District of Columbia, towards the Territory of either of those States, shall be deemed and taken to be as full and complete, in all respects, as the authority granted by that act to the Chesapeake and Ohio Canal Company, to extend the main stem of the said Canal within the said District, or the authority reserved to the Government of the United States to provide for the extension thereof on either, or both sides of the river Potomac, within the District of Columbia: *Provided*, That nothing, herein contained, shall impair the restriction in the Charter of the Chesapeake and Ohio Canal Company, designed to potect the Canal from injury, by the prolongation thereof, or by any branch therefrom.

A bill authorizing a subscription to the stock of the Chesapeake and Ohio Canal Company.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Treasury be, and he is hereby, authorized and directed to subscribe, in the name, and for the use of the United States, for twenty-five thousand shares of the capital stock of the Chesapeake and Ohio Canal Company, and to pay for the same at such times, and in such proportions, as shall be required of the other stockholders, by the rules and regulations of the Company: *Provided*, That not more than one-fifth part of the amount thereof, shall be required to be paid in any one year after the organization of the Company: *And provided, moreover*, That not less than an equal number of shares shall be otherwise

bona fide subscribed by competent persons, who shall satisfy the Secretary of the Treasury of their ability to pay for the same, or furnish to the Company such security therefor, as shall, in his judgment, be deemed sufficient to secure the future payment thereof.

SEC. 2. *And be it further enacted*, That the Secretary of the Treasury, for the time being, shall vote in person, or by proxy, for the President and Directors of the Company, and in all general meetings thereof, in conformity with the provisions of the charter of the Company, according to the number of shares at such times held, as aforesaid, by the United States, in the stock thereof; and shall receive upon the said stock, the proportion of tolls and emoluments which shall, from time to time, become due to the United States: *Provided*, That no dividend, profit, or emolument, upon the stock subscribed by the United States, shall become due, until the stock, other than that so subscribed, shall have netted to the share-holders, respectively, five per centum per annum on all sums of money actually paid in by the said holders, on account of the said stock, from the dates of their several payments, after which, the United States shall receive the surplus dividend, beyond such amount, until a common dividend of five per cent. per annum shall be netted by the United States, and all other subscribers, who shall have paid in money for their shares of the said stock.

SEC. 3. *And be it further enacted*, That the subscription aforesaid, of the United States, shall be valid, only upon condition that the dimensions of the said Canal shall not be less than those recommended in the report of the United States' Engineers, communicated by the President's message to both Houses of Congress, on the seventh day of December, eighteen hundred and twenty-six, being for the water line, at the surface of the said Canal, a breadth generally of forty-eight feet, and at the bottom thereof, of thirty-three feet, with a depth of water, no where less than five feet: *And provided moreover*, That, wherever practicable, by common excavation, the said Canal shall have the breadth of its surface enlarged to sixty feet, with a proportionate breadth at the bottom, and that the subdivision thereof, extending from the head of the Little Falls to Georgetown, shall correspond with the description thereof by the said report, but possess, throughout, the last named dimensions.

SEC. 4. *And be it further enacted*, That, to give effect to the said subscription, and to pay the first annual instalment thereof, at such times as, by the general regulations of the Company, the several portions thereof may be required, a sum not exceeding five hundred thousand dollars shall be, and the same is hereby, appropriated, out of any money in the Treasury, not otherwise appropriated.

SEC. 5. *And be it further enacted*, That, so soon as the Eastern section of the said Canal shall be completed, the Secretary of the Treasury is hereby authorized and required, on like terms and conditions, if necessary to the progress of the said Canal, to subscribe a like number of shares to the completion of the Western section thereof.

19th CONGRESS, 2d SESSION. [Doc. No. 10] EXECUTIVE.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

TRANSMITTING

A REPORT FROM THE SECRETARY OF WAR

WITH THAT OF

THE BOARD OF ENGINEERS

FOR

INTERNAL IMPROVEMENT,

CONCERNING THE PROPOSED

Chesapeake and Ohio Canal.

DECEMBER 7, 1826.

Read, and referred to the Committee on Roads and Canals.

WASHINGTON:

PRINTED BY GALES & SEATON.

1826.

WASHINGTON, *7th December*, 1826.

To the House of Representatives of the United States:

I now transmit a report from the Secretary of War, with that of the Board of Engineers for Internal Improvement, concerning the proposed Chesapeake and Ohio Canal.

JOHN QUINCY ADAMS.

DEPARTMENT OF WAR,

December 7, 1826.

SIR: I have the honor to lay before you the report of the Board of Engineers for Internal Improvements, on the proposed canal communication between the Chesapeake and Ohio.

I have the honor to be,

Your obedient servant,

JAMES BARBOUR.

The PRESIDENT *of the United States.*

ENGINEER DEPARTMENT,

December 6, 1826.

SIR: I have the honor to present, herewith, the report of the Board of Engineers for Internal Improvements, relative to the proposed canal communication between the Chesapeake and Ohio.

It is accompanied by tables in which the various results are consolidated; and, also, by drawings of the plan, and the several details thereof, and of the topography.

Respectfully submitted,

ALEX. MACOMB, *Maj. Gen.*
Chief Engineer.

The Hon. J. BARBOUR,
Secretary of War.

WASHINGTON CITY, *October* 23, 1826.

SIR: I have the honor to transmit to you a Report of the Board of Internal Improvement on the Chesapeake and Ohio Canal, comprising the Plan and Estimate of the same.

The following Memoirs, Draughts, Maps, and Profiles, accompany the present report:

MEMOIRS.

1. Report relative to the Survey for the Potomac Canal from Cumberland to tide water, 1825, by J. J. Abert, Lieutenant Colonel and Topographical Engineer.
2. Descriptive Memoir in relation to the Eastern Section of the Summit Level of the Ohio and Chesapeake Canal, 1825, by William G. McNeill, Captain U. S. Top. Engineers.
3. Descriptive Memoir in relation to the Casselman's River or Somerset Route for a Canal to connect the Youghagany and Potomac Rivers, 1825, by William G. McNeill, Captain U. S. Top. Engineers.
4. Memoir relating to the Surveys of those parts of the contemplated Chesapeake and Ohio Canal, executed under the direction of J. Shriver, Esq. by J. Shriver, U. S. Asst. Civil Engineer.

COLONEL ABERT'S

A. 1 Map of Proposed Canal along Potomac, from Cumberland to twelve miles below.
2. From above Point to three miles below mouth of Cacapon Creek.
3. From above Hancock to three miles above Williamsport.
4. From three miles above Williamsport to Harper's Ferry.
5. From Harper's Ferry to six miles below the mouth of Monocacy.
6. From six miles below the mouth of Monocacy to the Great Falls.
7. From the Great Falls to tide above Georgetown.
8. Profiles of Proposed Canal from Cumberland to below Gregg's Mountain.
9. From below Gregg's Mountain to Licking Creek.
10. From mouth of Licking Creek to below Shepherdstown.
11. From mouth of Antietam Creek to above the mouth of Seneca Creek.
12. From above the mouth of Seneca Creek to tide below the Little Falls.
13. Profiles of Feeders from Evitt's Creek to Licking Creek.
14. From Little Conococheague to Seneca River.

Captain McNeill's

M. 1. Map of the Eastern Section of the Summit Level of the Chesapeake and Ohio Canal, (part of Deep Creek, Crabtree Creek, and Savage River.)
2. Map and Profiles of a Survey for a Feeder from Deep Creek to Casselman's River.
3. Map and Profiles of Casselman's River, with Profiles of several of the Creeks and Sections across Casselman's River.
4. Profiles of Casselman's River, and relating to the Tunnel.
5. Maps and Profiles of Will's Creek, from Summit to the mouth of Little Will's Creek.
6. Do. from mouth of Little Will's Creek to Cumberland.
7. Map of Will's Creek, (Lieut. Williams's Survey.)

Mr. Shriver's

S. 1. Map of the Youghagany River, from base mark, on Deep Creek, to Smithfield.
2. From Smithfield to Connelsville.
3. From Connelsville to Sewickly Creek.
4. From Sewickly Creek to Pittsburg.
5. Map of the Survey of the Middle Route.
6. Map of the Western Section of the Chesapeake and Ohio Canal from Deep Creek to Pittsburg.
7. Profiles of do.
8. Profile of the proposed Canal Line on the East side of the Youghagany, from bench mark, at Deep Creek, to Smithfield.
9. Profile of do. from Smithfield to below Connelsville.
10. Profile of do. from near Connelsville to Pittsburg.
11. Profile of the proposed Canal Line bench mark, at Deep Creek, to mouth of Bear Creek, (Buffalo Marsh Run Route.)
12. Profile of the proposed Canal Line on the West side of the Youghagany, from mouth of Bear Creek to opposite Connelsville.
13. Profile of do. from opposite Connelsville to Pittsburg.
14. Profile of Survey of Middle Route, to Map No. 5.

Board of Internal Improvement's

No. 1. General Map of the Country between Washington and Pittsburg.
2. General Profile of the Chesapeake and Ohio Canal.
3. Plan of a Lock and Transverse Sections of the Canal.
4. Tunnel, Shafts, Heading, and Section of a Deep Cut.

I have the honor to be, sir, very respectfully, your obedient servant,

S. BERNARD, *Brig. Gen.*
Member of the Board of Internal Improvement.

Major Gen. Alexander Macomb,
Chief Engineer.

REPORT

OF THE

BOARD OF INTERNAL IMPROVEMENT

ON THE

Chesapeake and Ohio Canal,

COMPRISING THE PLAN AND ESTIMATE OF THE SAME.

OCTOBER 23, 1826.

The operations which have been executed in the field, in 1824, in relation to the contemplated Chesapeake and Ohio Canal, had chiefly for object to ascertain the practicability of the undertaking: those performed in 1825 were to determine the route to be recommended, as also to obtain the data necessary to frame a general plan of the work, and a preparatory estimate of the expense.

Another series of operations remains yet to be executed: 1. To locate accurately the canal on the ground, and to fix the final site of the locks, aqueducts, culverts, dams, bridges, &c.; 2. To frame for each portion of canal the plans and profiles necessary for its execution; 3. To make, on the spot, the calculations of excavation and embankment; 4. To draw up the estimate of each individual work according to local circumstances; 5. To prepare the proper specifications to put the work under contract. This series of operations belongs more properly to the construction than to the general plan of the canal, and may be deferred until the execution shall have been decided. These operations will then keep pace with the execution of the work, and their results for each portion will improve by the experience gradually acquired during the construction of the canal.

These considerations, the scarcity of means at our disposal at this time, and the expediency of affording a result as to this great important national work, have induced us to limit the surveys to those strictly necessary to enable us to frame a general plan and a preparatory estimate.

In the report submitted by the Board on the 2d of February, 1825, (marked A among the documents which accompanied the President's

message, of the 14th of February, 1825,) all the experimental lines surveyed in 1824 have been described, and mention has been made of several others which were yet to be surveyed. We have also presented, in the same report A, the considerations relative to the hydrography of the country in the general direction of the canal; we will, therefore, confine ourselves to the description of the experimental lines, which, on account of the advanced season in 1824, had been postponed to 1825: we will compare these lines to the others, and point out the route which seems to us entitled to preference.

EXPERIMENTAL LINES.

*Summit level by Deep Creek.** In the report A, it had been anticipated that the section of canal from the tunnel at Dewickman's Arm to the mouth of Bear Creek,§ would follow the valley of Deep Creek as far as the Rapids, then turn Panther's Point and descend to the mouth of Bear Creek along the left side of the Youghagany. However, it became necessary to compare this route with another more direct, which, following the former as far as Deep Creek Bridge, would continue to Rock Lick Run, a Western tributary of Bear Creek. The survey has shown, that the bottom of canal being assumed three feet above the bottom of Deep Creek at the Bridge, a tunnel would be necessary to cross the ridge which separates Buffalo Marsh Run from Rock Lick Run. The distance and descent are as it follows:

	Mls.	Yds.	Feet.
From the Eastern end of the tunnel at Dewickman's Arm to the Base-mark at Deep Creek,† -	6	1048	
Descent in this distance, - - - -			000
From the Base-mark to the debouch into Rock Lick Run,	5	38½	
Descent in this distance, - - - -			000
From this debouch to the mouth of Bear Creek,‡ -	7	535½	
Descent in this distance, - - -			912
Total	18	1622	912
In this total distance two tunnels would be necessary: one at Dewickman's Arm, whose length would be	1	568	
And whose bottom would be below the top of the ridge			233
One at Buffalo Marsh Run, whose length would be	2	254	
And whose bottom would be below the top of the ridge			343
Total length of tunnels,	3	822	

In order to remove all doubts as to the expediency of this portion of canal route, and to lessen, as much as practicable, the length of the tunnels, and the excavation at their deep cuts, a second line, 13 feet 9 inches higher than the preceding one, has been tried; the results of which are as follows:

* General Map, Sheet No. 1.
† Sheet M, No. 1.
§ Sheets M, No. 1, and S. Nos. 1, 6, 7, & 8.
‡ Sheet S, No. 11.

	Mls.	Yds.	Feet.
From the Eastern end of the tunnel at Dewickman's Arm to the Base-mark at Deep Creek Bridge, -	7	216	
Descent in this distance - - - -			000
From the Base-mark to the debouch into Rock Lick Run,	5	38½	
Descent in this distance, - - -			000
From this debouch to the mouth of Bear Creek, -	7	535½	
Descent in this distance, - - -			925¾
	19	790	925¾

As to the length of the tunnels, and the height of the ridges above the bottom of tunnels, they are, respectively:

	Mls.	Yds.	Feet.
Dewickman's Arm, length, - - -	1	278	
Height of the ridge, - - - -			219¼
Buffalo Marsh Run, length, - - -	1	1215	
Height of the ridge, - - - -			329¼
	2	1493	

This arrangement would lessen the length of tunnels by 1089 yards, and also the excavation, through the valley of Deep Creek, by at least one million of cubic yards. But the level of this route being 13¾ feet higher than that of the former route, the volume of available water in the reservoir of Deep Creek would be much diminished, and it would also become necessary to raise, by 13¾ feet, the dams recommended (in the report A) across the Youghagany, in order to feed the canal, a circumstance which would increase the expense and difficulty attending the erection of these dams. It must be observed that Deep Creek, alone, is altogether unable to feed a summit level; whilst it scarcely yields, during the dry season, five cubic feet of water per second, its tributaries are liable to become entirely dry, as it happened in 1825.

* However, we will compare this direct route, running from Dewickmam's Arm to the mouth of Bear Creek, with that through Deep Creek and the right side of the Youghagany, and whose distance and descent are as follows:

	Mls.	Yds.	Feet.
From the Eastern end of the tunnel at Dewickman's Arm to the Base-mark at Deep Creek Bridge	6	1048	
Descent in this distance, - - -			000
From the Base-mark to the Western end of the summit level, - - - - -	6	204⅔	
Descent in this distance, - - - -			000
From the Western end of the summit level to the mouth of Bear Creek, - - -	15	100	
Descent in this distance, - - -			912
Total	27	1352⅔	912

* Sheet M, No. 1. Sheet S, No. 1.

On this portion of route there would be one tunnel only, (at Dewickman's Arm,) whose length, as already stated, would be 1 mile 568 yards.

The distance and descent in following the direct route would be, as above, 19 miles 790 yards 925¾ feet.

The length of the two tunnels, taken together, would be, as above, 2 miles 1493 yards.

The direct route would therefore be 8 miles 562⅔ yards shorter than the other: but it would require a greater length of tunnel by 1 mile 568 yards, and cause an increase of lockage of 27½ feet, which, as to time and expense, gives a decided advantage to the other route. Again: the descent from the debouch into Rock Lick Run to the mouth of Bear Creek, is 925¾ feet on a distance of 7 miles 535½ yards, which, in the supposition of an uniform declivity, could afford but 115 yards to the location of one lock, 8 feet lift, with its adjoining pond; but this declivity is far from being uniform, and in some places it will be so rapid as to oblige to locate the locks quite close to each other; a circumstance which would involve the expense of a double set of locks. All these considerations, added to the difficulty of feeding the upper level, induce us to reject this direct route, and to give the preference to that through the valleys of Deep Creek and of the Youghagany, as assumed in the report A. [February, 1825.]

*Summit level by Flaugherty Creek.** But a much more important route was yet to be examined, which, having its summit level at the sources of Will's Creek, would commence at Cumberland, ascend this creek, cross the ridge which separates Will's Creek from Casselman's River, and descend the valley of this stream to debouch into the Youghagany at its junction with Casselman's River and Laurel Hill Run.

Mention has been made of this route in report A, (pages 40 and 41;) some experimental lines were surveyed on the summit ground in 1824, and some measurements of water were taken. But the season being then too far advanced to prosecute farther the surveys and levellings relative to this route, the Board were compelled to defer their execution until 1825; and, as early as the 12th of March, 1825, they framed detailed instructions respecting the surveys and investigations necessary to ascertain the practicability of a route of canal in this direction. This route deserved so much the more a careful examination, that it promised, by means of a tunnel, a shorter distance; but it became necessary to ascertain, in the first instance, the minimum length of the tunnel which should receive, at its Western end, water enough from Casselman's River to supply the summit level, and a portion of the canal down Will's Creek. Upon this point rested the practicability of this route. Indeed, the survey made, in 1824, had tried a tunnel of 1,483 yards in length, with a greatest height of ridge of 156 feet; but the essential condition of a sufficient supply of water had not been obtained at such an elevation. It therefore remained to find out, by surveys, a tunnel combining the shortest length with a

* Sheet M, Nos. 3 and 9.

competent supply of water. These surveys were entrusted to Captain Wm. G. McNeill, of the Topographical Engineers, who carried them, in the most able manner, into execution.

* The result has been, that a tunnel from the mouth of Bowman's Run, in Wills' Creek, to the mouth of Flaugherty Creek, in Casselman's River, was the shortest which could be admitted to procure, at the same time, the other requisite as to the sufficiency of water. The length of this tunnel is 4 miles 80 yards, with a deep cut at each end: the Eastern being 140 yards long, the Western 1060 yards; the greatest depth of each 35 feet, but the height of the top of the ridge above the bottom of the tunnel is not less than 856 feet.

Let us now examine the resources afforded to feed this summit level. Casselman's River is the only stream upon which we can rely to fulfil this object. It yielded, on the 21st of June, 1825, at Pleucher's Farm, 12 miles above the mouth of Flaugherty Creek, 18 cubic feet of water per second; on the 7th of the same month, it yielded at the same place 44 cubic feet per second. On the 10th of July, same year, it yielded 38 cubic feet per second, above the mouth of Flaugherty Creek. It must be observed, that, in consequence of a freshet, the stream, on the 24th of June, 1825, yielded at Forney's Mill, 5 miles above Flaugherty Creek, 803 cubic feet per second; three days afterwards, it still delivered 103 cubic feet. From all these results, we adopt the smallest; and we assume 18 cubic feet as the minimum of water supplied by Casselman's above the mouth of Flaugherty Creek. Besides this supply of running water, two reservoirs can be made in the bed of the stream: one at Pleucher's Farm, containing 4,679,029 cubic yards; the second, below Forney's Mill, containing 17,091,490 yards, together, about 22,000,000 yards. The dam of the first would be 40 feet high, 230 yards long at the top, the foot 114 feet above the summit level; the dam to form the other would be 50 feet high [to obtain a height of 40 feet of available water,] and from 140 to 160 yards long at the top. The feeder from the upper reservoir to the lower one would be about 7 miles; but the feeder from the lower and large reservoir to the summit level would be 3⅓ miles only. The area of the reservoir at Pleucher's Farm will be 1,040,600 square yards; that of the great reservoir 2,541,000 square yards: total together, 3,581,600 square yards.

We shall, in the sequel of this report, take into more minute consideration these supplies of water; for the moment we leave the subject to present a comparison between this route of canal, and that by Deep Creek, as suggested in the report A, by and in consequence of the limited facts which, then, it had been in our power to ascertain. The first will be designated Casselman's route, the other Deep Creek route.

The length, ascent, descent, of the Casselman's route are as follows:

* Sheet M. No. 3.

	Mls.	Yds.	Feet
* From Cumberland Bench mark to the Eastern end of the summit level - - -	29	240	
Ascent in this distance - - - -			1,325
Summit level { Eastern basin 880 yds.; Eastern deep cut 140; Tunnel 4 miles 80; Western deep cut 1,060; Western basin 880 }	5	1,280	
From the Western end of the summit level to the Youghagany, 440 yards below the mouth of Casselman's River - - -	35	1,250	
Descent in this distance - - -			636
Total distance and lockage	70	1,010	1,961

The length, ascent, descent, of the Deep Creek route are as follows:

From Cumberland Bench mark to the mouth of Savage River † - - - -	30	350	
Ascent in this distance - - - -			327½
From the mouth of Savage to the mouth of Crab Tree Creek ‡ - - - -	5	000	
Ascent in this distance - - -			383
From the mouth of Crab Tree Creek to the Eastern end of the summit level - - -	8	1,430	
Ascent in this distance - - - -			1,051
Total ascent - - - 1,761½ feet.			
	44	20	1,761½
Summit level { Eastern deep cut 352 yds.; Tunnel - 1 568; Western deep cut 5 480; Western end 6 204⅔ }	12	1,604⅔	
From the Western end of the summit level to the mouth of Bear Creek ‖ - - -	15	100	
Descent in this distance - - -			912
From the mouth of Bear Creek to a point in the Youghagany, 440 yards below the mouth of Casselman's - - - - -	16	1,075⅓	
Descent in this distance - - -			164
Total descent 1076 feet			
Total distance and lockage - - -	88	1,040	2,837½

Both summits of these routes, being compared, as to altitude, to the Cumberland Bench Mark, will show a difference of level of 436½ feet in favor of the Casselman's route. This difference would be

* Sheets M. Nos. 3, 4, 5, 6. † Sheet A. Survey of 1824. ‡ Sheet M. No. 1.
‖ Sheet M. No. 1. Sheet S. No. 1.

440 feet, if the level of comparison were assumed at the point of junction of these routes into the Youghagany; but as at this point no well-fixed bench mark had been agreed to between the two surveying parties, we rely, in preference, on the former result. This important result shows that, through Casselman's, the lockage will be 873 feet less than through the other route.

As to distance, the foregoing statements exhibit a length of 18 miles 30 yards, in favor of the Casselman's route; which, combined with a less amount of lockage, gives to this route, as to time, a decided advantage over the Deep Creek route.

Let us examine now, which of these routes will afford the greatest facility to the location of the locks.

By assuming 8 feet as a common lift, we find that from Cumberland to the mouth of Savage, the average distance between the heads of the two locks, will be - - - - 1,296 yards.

From the mouth of Savage to Crab Tree Creek - 183

From the mouth of Crab Tree Creek to the Eastern end of the summit level - - - - 117

And this on the supposition of an uniform declivity; which is far from being the case, and more especially in the valley of Crab Tree Creek, where, towards the head, the locks, on account of the steepness of the ascent, could not even find room, unless their lift should be considerably increased. To this difficulty we must add the narrowness of the valley, which would oblige to resort to very expensive means to erect, where necessary, double sets of locks, as also to shelter the work from destruction, either by high freshets or by heavy showers.

As to the Western section of this route, serious difficulty would be encountered to turn Panther's Point, the sudden fall being great, and the side of the valley very precipitous. * It would become necessary to descend, at once, about 400 feet, in a distance which could hardly afford room for the location of locks succeeding close to each other, without intermediate ponds. This circumstance would either necessitate a double set of locks, or oblige to stretch, at considerable expense, the line of canal around this steep spur which separates Deep Creek from Hoy's Run.

These difficulties, as to the location of locks, are not to be met with on the Casselman's route. † In the valley of Wills' Creek, 200 yards will be the shortest distance between the heads of two successive locks, and in that of Casselman's, 300 yards. We must also remark, that, though the valley of Wills' Creek becomes gradually narrower above the mouth of Little Wills' Creek, yet it affords room enough for the works, and these will be more easily protected against freshets and showers than they could be in the valleys of Crab Tree Creek and Savage River.

The foregoing considerations show that, in relation to a less difficult location of canal, the Casselman's route has, [abstraction being

* Sheet S. No. 1.

† Sheets M. Nos. 3, 4, 5, 6.

made, for the present, of the tunnel.] a decided advantage over the Deep Creek route. But another important object is also to be examined; we mean the supply of water at the respective summit levels.

Respecting this point, it has been seen that the resources yielded by Casselman's, above the mouth of Flaugherty Creek, consisted of 18 cubic feet per second of running water, and of two reservoirs of available stored water, amounting to about 22,000,000 cubic yards. As to the Deep Creek summit level, it has been shown, in report A, [February, 1825.] that Deep Creek delivered, as a minimum, 5.12 cubic feet per second, [page 32:] the Little and Great Youghagany, together 26.88 cubic feet per second [page 38.] Total of running water, 32 cubic feet per second.

The reservoirs in Deep Creek amount to 2,214,156 cubic yards of available water, [page 32.] and those in the Youghagany to 23,689,007 cubic yards together, [page 37.] Total, 25,903,163 cubic yards: we assume 26,000,000. These supplies of water will compare as follows:

	Cubic feet per second.		Cubic yards.
Deep Creek summit, running water,	32	Reservoirs	26,000,000
Casselman's summit, ditto -	18	Ditto	22,000,000
Difference in favor of Deep Creek	14		4,000,000

But the following remarks will attenuate this advantage, and induce to place these resources upon a nearer footing. 1. Deep Creek and both Youghaganies were gauged in 1824, whereas Casselman's River was measured in 1825, whose summer and autumn were dryer than those of the preceding year. 2. The feeder destined to bring the water of the Youghagany reservoirs into the summit level of Deep Creek, will be about 12 miles long, whilst the feeder from the great reservoir below Forney's Mill will be but 3⅓ miles in length. Therefore, the loss of water by evaporation and leakage, will be for the latter the fourth of that for the former. This fact deserves so much the more due attention, that experience has proved positively that such losses were by far greater in feeders than in portions of canal of the same length. 3. The 18 cubic feet per second allowed to Casselman's River, were gauged at Pleucher's Farm, 114 feet above the summit level, and no account has been kept of the water delivered by Meadow Run, Tub Run, Pine Run,* tributaries of Casselman's, whose mouths are below Pleucher's Farm, and higher than the summit-level: however, they have yielded together, as a minimum on the last days of June, and first days of July, 1825, 13.84 cubic feet per second. 4. The reservoirs in the Youghagany present to evaporation an area of [*Report A. page 37.*] - 12,452,928 sq. yds.
Whilst those in Casselman's present but - 3,581,600

Difference in favor of the latter - - 8,871,328 sq. yds.

* Sheet M. No. 3.

A difference which will cause a saving of about six millions cubic yards of water, the yearly fall of rain being supposed to be but 36 inches, and the common ratio of 5 to 3 being admitted between the yearly evaporation and fall of rain upon the surface of a given reservoir.

The foregoing facts and computations lead us to the conclusion, that, with respect to water supply, both routes may be considered as on equal footing. It remains now to compare the expense attending the construction of either route.

The lockage on the Deep Creek route is 873 feet more than on the Casselman's route, to which are to be added, for double set of locks in Crabtree Creek, at least 350 feet, and at Panther's Point, at least 200 feet, total 1423 feet, or 178 locks eight feet lift, which would cost $2,136,000, at the rate of $12,000 each.

The Deep Cut, from the Western end of the tunnel to the base mark, at Deep Creek bridge, is 5 miles 480 yards long, and has, at its Eastern end, a depth of 40 feet, which diminishes gradually on approaching the base mark. The amount of its excavation will be 1,407,961 cubic yards, from which subtracting 87,556 cubic yards, amount of excavation for the Western Deep Cut of the Tunnel at Flaugherty, it remains 1,320,405 cubic yards to the disadvantage of the Deep Creek route. On the reasonable supposition that the ground will require, for excavating, two men, one with shovel, the other with pick, and the transportation being assumed at the distance of ninety yards upon an ascent of one-twelfth, this excavation will cost $448,-937 70, at the rate of 34 cents the cubic yard.

The Dewickman's Tunnel is 1 mile 563 yards long, and has 233 feet of height of ridge above its bottom.

The Flaugherty's Tunnel is 4 miles 80 yards long, and has 856 feet of height of ridge above its bottom.

Difference in favor of Deep Creek, 2 miles 1272 yards in length, and 623 feet in height of ridge above its bottom.

The comparative cost of these Tunnels will be as follows, the substance supposed to be sand stone:

	FLAUGHERTY'S.	DEWICKMAN'S.	*Difference.*
Shafts, - -	$233,032 95	17,108 99	215,923 96
Heading, - -	383,534 83	119,738 12	263,796 71
Side Heading, -	7,704 27	2,704 27	5,000 00
Tunnel, - -	2,495,242 80	808,106 50	1,687,136 30
Draining, -	159,469 30	7,010 90	152,458 40
Total cost, -	$3,278,984 15	954,668 78	2,324,315 37

Respecting the dams to be erected across the two Youghaganies, to form the reservoirs destined to supply the Deep Creek Summit, they should have, at least, a height of 50 feet, and may be reduced to four in number. They would also measure, together, a length of 1200 yards at the least. As to those across Casselman's, they may be reduced to one only, below Forney's mill; its height will be 50 feet,

and its length at the top 160 yards. The expense for this object will therefore be seven and a half times as great for the Deep Creek as for the Casselman's route.

The dam below Forney's mill will cost - - -	$27,601 60
Therefore, the dams across the Youghaganies, will cost, together, - - - - -	207,012 00
Difference in favor of the Casselman's route, - -	$179,410 40

Finally, the route by Deep Creek will be 18 miles 30 yards* longer than by Flaugherty Creek. These 18 miles, in the most favorable supposition of level cutting and light ground, will cost at the rate of $0.136 per cubic yard, digging and transportation included, $96 940 80.

Recapitulating now the extra expenses for each route, we find them as follows:

Deep Creek Route.	
For lockage, - - - - -	$2,136,000 00
the Western Deep Cut, - - -	448,937 70
the Dams, - - - - -	179,410 40
the 18 miles, - - - -	96,940 80
Total, -	2,861,288 90
Casselman's Route.	
For 2 miles 1272 yards of Tunnel, - -	2,324,315 37
Difference in favor of this route, - - -	$536,973 53

The Casselman's route will, therefore, be less expensive than the Deep Creek route; its supply of water nearly the same; its location more easy; its summit level less liable to be encumbered at the ends; and, on account of less lockage and shorter length, it will produce a saving of time of 22 hours. All these results combined, lead us to give to the Casselman's route a decided preference.

Before closing this part of our report, we must exhibit the results of an attempt made to avoid the rugged portion of the Youghagany,† where the stream forces its way through Briery Mount and Laurel Hill. To this effect, a route was tried, which, commencing either at the fork of Bear Creek, or above the Swallow Falls, in the Youghagany, runs through Asher's Glade, a depression of Briery Mount, thence crosses, by a tunnel, Laurel Hill,‡ to follow afterwards its Western side, and debouch into the Youghagany, at the mouth of Dunbar Creek, one mile above Connelsville.

Mention has been made of this route in the Report A. (February, 1825,) page 44. Though the single inspection of the ground had sufficiently shown that very little reliance was to be placed upon it, yet it was essential to try its degree of practicability; its surveys and levellings were, therefore, made at as long sights as the ground would admit.

* General Map, No. 1. † Sheets S, Nos. 1, 5. ‡ Sheet S, No. 14.

The fork of Bear Creek, that is, the point where the Western and Eastern branches unite, has been found to be $780\frac{93}{100}$ feet below the base mark, at Deep Creek bridge, and $649\frac{9}{100}$ feet below Briery Mount, at Asher's Glade. Therefore, Asher's Glade is but $131\frac{84}{100}$ feet below the base mark at Deep Creek. This fact alone shows the absolute impracticability of obtaining a line of canal in this direction. It shows, also, that, whatever may be the line devised to reach Asher's Glade, it cannot be kept lower than $131\frac{84}{100}$ feet below the summit level of Deep Creek, and must rely on the Youghagany alone for its supply of water; and this for its whole length, from Deep Creek to the mouth of Dunbar Creek; the resources afforded by the intervening streams being, in summer, of no consequence.

By trying a line through the left side of the Youghagany,* we should first cross this stream by an aqueduct of more than 150 feet high, then follow the Western side of the valley, to strike, in succession, the head branches of Buffalo Creek, Big Sandy Creek, Little Sandy Creek. The line would then cross Laurel Hill, by a tunnel of one and a half mile in length, and 547 feet under the ridge, and thence descend to the mouth of Dunbar Creek, after having traversed deep and numerous ravines which furrow the Western side of Laurel Hill. It must be remarked, that, from the Little Sandy to the mouth of Dunbar Creek, in a distance of about 12 miles, this route of canal would oppose difficulties which would be far greater than those to be met with in the valley of the Youghagany, where the stream breaks through Briery Mount and Laurel Hill.

The distance from Deep Creek to Connelsville, by this route,† would be 71 miles, and six miles longer than through the valley of the Youghagany; and if we add to the foregoing statements the deficiency of water, we must conclude that a canal following this direction is utterly inadmissible.

In conformity to an order of the Engineer Department, a levelling has been made, in March, 1826, in relation to a feeder destined to transfer the water supply of Deep Creek summit to the Casselman's summit. Capt. Wm. G. McNeill, of the Topographical Engineers, to whom this duty was assigned, received from the Board the necessary instructions. His report affords the following results:

Length of the Feeder.‡

	Miles.	yds.
From the base mark, at Deep Creek bridge, to the point where the feeder meets Casselman's river, - -	15	585
From this point to the bridge across Casselman's river, on the national road, (nearly) - - - - - -	8	880
Thence to the reservoir at Pleucher's farm, - -	1	880
Add the length of feeder from the dams in the Youghagany to the reservoir at Deep Creek, - - - -	12	
Total length,	37	585

* Sheets S, No. 1, 5, 12, 13, 14. † Sheets S, No. 12, 13, 14. ‡ Sheets M, No. 2, 3.

On this distance there are four deep cuts and two tunnels, viz :

	Miles.	yds.
A deep cut terminating in Buffalo Marsh Run, - - -	2	757
Thence a tunnel to the valley of Bear Creek, - - -	5	939
A deep cut from the end of this tunnel, - - - -	0	708
A deep cut at the Western side of Negro Mountain, - -	0	278
A tunnel through this mountain, - - - - -	1	1640
A deep cut from the end of this tunnel, - - - -	0	330
Together,	10	1132

Out of which, for deep cuts, having 35 feet of greater depth, 3 miles 313 yards—for tunnels, 7 miles 819 yards.

It is fortunate that so long and so expensive a feeder can be dispensed with.

The foregoing facts and investigations, connected with those exposed in the Report A, (February, 1825,) lead us to recommend the following route for the Chesapeake and Ohio Canal.

From Georgetown, D. C. to Cumberland, it will ascend the valley of the Potomac, thence the valley of Will's Creek to the mouth of Bowman's Run. It will then cross the summit ridge by a tunnel, and descend, in succession, the valleys of Casselman's river, and the Youghagany, to terminate at Pittsburg, Penn. at the mouth of the Monongahela.

We have now to present the description of the general plan of the work; but, as we think it more expedient to progress simultaneously with the description and estimate, we will previously give an analysis of the main prices upon which the estimate is calculated, and point out the dimensions upon which the plan is predicated.

We observe, also, that the whole line of canal will be subdivided into three distinct sections, each of them forming, of itself, a separate system, viz :

Eastern Section—from Georgetown to Cumberland;

Middle Section—from Cumberland to the mouth of Casselman's river;

Western Section—from the mouth of Casselman's to Pittsburg.

ANALYSIS OF PRICES.

In fixing these prices, it has been supposed that the works of all kind are to be built of the best materials the country can afford; and that the workmanship be as perfect as compatible with a well understood economy.

In the general estimate to which these prices are applied, it is supposed that the dimensions of each individual work should be calculated for durability, besides fulfilling the requisites appertaining to the intended object of the work.

It was not an easy task to establish these prices. In the first instance, we cannot provide for the fluctuation of prices which will pro-

bably take place during the many years which the completion of the canal will require; neither can we foresee what increase will arise in the price of labor, from expending large sums of money in districts of country where labor is not now in great demand. And, again, the nature of the general estimate we were to present, did not comport with individual prices adapted to each separate portion of canal, and derived from the local circumstances belonging to each. Indeed, such prices are to be framed to make the individual estimates upon which the contracts shall be passed for the execution of the work; but, at the present stage of our task, we are not prepared to afford the plans, profiles, details of location and construction, upon which such estimates must be predicated; and, therefore, we find ourselves obliged to adopt mean prices which are to be applied to the whole line of canal, abstraction being made of the diversity of local circumstances.

But, in framing these prices, and the estimate, though great regard was paid to a due and strict economy, yet we kept constantly in view, that we were planning a work for a nation, and that durability of the whole, and fitness of the parts, were the essential requisites of such a work. We thought that, in the present case, it did not belong to us to curtail the cost, in order to derive from its capital a greater interest, or, in other words, to lessen the former with a view to increase the latter, to the detriment of durability and conveniency. We took, rather, care, 1st, That the expenses for repair should affect, as little as possible, the probable revenue of the canal; 2d, That the navigation should not, in consequence of vicious and defective construction, be subject to be frequently stopped by fortuitous accidents to the works.

However, we must observe, that, whenever we had strong motives to hesitate in fixing the prices, or in framing the estimate, we have adopted, generally, the safest side; but, in return, we have allowed no item for unforeseen expenses, which item is usually, in similar estimates, from five to ten per cent.

These premises being submitted, we will now present the analysis of the main prices we have used in the formation of the estimate:

EXCAVATION AND EMBANKMENT.

1. Sand and clay, alluvial bottom, light earth, excavated and thrown into a cart or wheelbarrow—a cubic yard, - $0.068

The wages of a good laborer, able to excavate and throw into a cart or wheelbarrow, 15 cubic yards in a day's work of 10 hours, are computed at $1.00 per day; therefore, 15 cubic yards will cost $1.00, and one cubic yard - - - - - - - - $0.067
Add for tools, - - - - - - - - 0.001

$0.068

A good hand, able, in ten hours, to excavate and throw 15 cubic yards, will receive, per month of 30 days, wages. - - - - - - - - - $12.000
Board, at the rate of 2 dollars per 7 days, - - 8.571
Whiskey, $0.02 per day, - - - - - - 0.600

$21.171

Taking out four Sundays and four rainy days, it remains 22 days of effective labor, which will come, per day, to - - - - - - - - - - $0.960
Add for accidental loss of time, - - - - - 0.040

$1.000

Nota. A number of common hands would hardly average 12 cubic yards each per day's labor, especially during the warm season.

2. Hard clay, which would require one man with shovel, and one man with pick for two diggers, to excavate and throw 15 cubic yards in ten hours—a cubic yard, - - - $0.102
One digger, with shovel, - - - - - $1.000
Half a man, with pick, - - - - - - 0.500

For 15 cubic yards, - - - - - - $1.500

For one, - - - - - - - - - $0.100
Add for tools, - - - - - - - 0.002

$0.102

3. Quick sand, soft mud—a cubic yard, - - $0.136
One man can hardly, in ten hours, excavate and throw seven and a half cubic yards of such stuff.
For seven and a half cubic yards, - - - - $1.000

For one, - - - - - - - - - 0.134
For tools and implements, - - - - - 0.002

$0.136

4. Slate very soft, and very hard clay, which would require one man with shovel, and one with pick, to excavate and throw 15 cubic yards in ten hours.
Two hands for 15 cubic yards, - - - - - $2.000

For one cubic yard, - - - - - - - 0.134
For tools, - - - - - - - - - 0.002

0.136

5. Hard slate, which, in ten hours, would require two men with picks, and one man with shovel, to excavate and throw 15 cubic yards—a cubic yard - - - - - - - $0.203

Three hands for 15 cubic yards, - - - -	3.000
For one cubic yard, - - - - - -	0.200
For tools, - - - - - - - -	0.003
	$0.203

6. Slate rock, which, in ten hours, would require three men with picks, and one man with shovel, to break and throw 15 cubic yards, a cubic yard - - - - - - - $0.275

Four hands for 15 cubic yards, - - - -	4.000
For one cubic yard, - - - - - -	0.266
For tools, - - - - - - - -	0.009
	$0.275

7. Slate rock limestone in strata, red sandstone which would require blasting—a cubic yard, - - - - - $0.625

From 50 to 75 cents has been paid for similar work in this country; the cutting varying from 3 to 6 feet in depth; a mean between 50 and 75 cents is herein adopted.

8. Unstratified limestone, which would require blasting—a cubic yard, - - - - - - - - $0.875

In ordinary cases, and for similar work, in this country, from 75 to 100 cents has been paid: the depth of cutting being from 3 to 6 feet; a mean between these two prices is herein admitted.

9. Unstratified limestone, sandstone, and other rocks of same hardness, whose blasting should be executed in a confined and contracted space—a cubic yard - - - - - $1.000

In similar case, one dollar, and more, has been paid in this country.

10. Ramming and dressing of banks. A cubic yard, $ 0.0023

By actual experiment.

Labor, - -	$ 0.00222
Tools, -	0.00009
	$ 0.00231

TRANSPORTATION.

11. Transportation of earth to the distance of 40 yards on a level, or 30 yards on an ascent of $\frac{1}{12}$, by a wheelbarrow—a cubic yard, - - - $ 0.068

It is found, by experiment, that a stage [by a stage is meant the travelled distance from one station to the next one,] of 40 yards, will keep employed both the digger (No. 1) and the carrier, without loss

of time by one waiting for the other, when the wheelbarrow used contains $\frac{1}{24}$ of a cubic yard.

The transportation of 15 cubic yards will, therefore, cost - - - -	$ 1.000
Add for implements, planks for road, -	0 015
	$ 1.015
One cubic yard, - - -	$ 0.068

When the distance is greater than 40 yards on a level, or 30 yards on an ascent of $\frac{1}{12}$, it is divided into successive stages of 40 yards in the first case, and 30 yards in the second. At each station is a carrier; and, therefore, to the price of excavation, is to be added as many times the above price of transportation as there are stages. When the distance is less than the length of the stage—half, for instance—then half the price of transportation is only to be added: in this case there would be but one carrier for two diggers.

12. Transportation of earth to the distance of 600 yards on a level, or 400 yards on an ascent of $\frac{1}{20}$, by a cart with one horse—a cubic yard, - - $ 0.282

Such a cart can transport, to the above distance, 10 cubic feet of earth [the horse being a good one,] each time, and make 18 trips in a day's work, or 180 cubic feet, equivalent to 6.666 cubic yards.

Assuming $ 1 88 per day's labor of the driver and horse, the transportation of 6,666 cubic yards will cost - - - -	$ 1.880
And a cubic yard, - - -	$ 0.282

PUDDLING.

13. The square yard, 18 inches thick, - - $ 0.124

GRUBBING.

14. Per running yard, and for the required width, -

This price is given approximatively, the difficulty of the work varying from one place to another, according to the thickness of the growth, the kind of trees, and the nature of the soil.

MASONRY.

Before entering into the analysis of prices relating to mason work, we shall present a summary view of the building materials to be found along the line of canal, from its commencement at Georgetown to its termination at Pittsburgh.

Eastern Section. From Cumberland down to Hancock [60 miles,] the banks of the Potomac are formed of a variety of rocks, chiefly sandstone, schists, slates. On the Virginia side, limestone is found above the mouth of the South Branch.

From Hancock down to Georgetown [126 miles.] the banks present masses of limestone, sandstone, and slate rocks.

On this total distance of 186 miles there will be 74 locks.

Middle Section. From Cumberland up to the mouth of Little Wills' Creek [14 miles,] the valley is chiefly of sandstone; but at the 4½th, 8th, and 14th mile, masses of limestone rock are met with.

On this distance 39 locks are to be located.

From the mouth of Little Wills' Creek to the summit level, the banks of the valley are entirely of sandstone rocks. No appearance of limestone has been seen.

On this distance of 15 miles only, 127 locks are to be erected; that is, 9 locks more than on the whole distance from the mouth of the Little Wills' Creek to Georgetown (200 miles.)

From the summit level down to the mouth of Casselman's (35¾ miles,) the valley is chiefly of sandstone and slate rocks. Limestone is found in some tributaries, and, among others, in Pine Run, six miles South of the Western end of the summit level.

On this distance there will be 80 locks: that is, as many as on the following section from the mouth of Casselman's River to Pittsburg.

Western Section. From the mouth of Casselman's to Connelsville (27½ miles,) the deep and narrow valley of the Youghagany presents a variety of good building sandstone; and appearances of coal make it probable that limestone will be found in their vicinity.

On this distance 54 locks are to be located.

From Connelsville to Sewickly Creek (27 miles,) sandstone and slate rocks form the sides of the valley: but, a few miles below Connelsville, appearances of coal, then limestone ledges, are met with; and, at four or five miles below Connelsville, banks of coal and of limestone are found.

On this distance 18 locks are to be erected.

From Sewickly Creek to the mouth of the Youghagany (16½ miles,) the bluffs of the valley are frequently of a ledge of very hard limestone, occurring just above high-water mark, and having a superincumbent structure of common rocky materials. This limestone quarries in regular prismoidal masses: some hope is entertained that it may produce an hydraulic lime.

On this distance but one lock is contemplated.

From the mouth of the Youghagany to Pittsburg (14 miles) the Monongahela runs through a limestone land, but the building materials do not appear at the surface of the ground.

On this distance 5 locks are to be located.

This summary shows, that, along the whole line of canal, good building stone will be easily procured: but a proper choice will be requisite, and though, in locating finally the individual works, care will be taken to have them as near as practicable to the quarry, yet it cannot be anticipated that, in most cases, it will be possible to save, absolutely, the expenses attending the transportation of stone materials from the quarry to the very spot where they will be required. The means of transportation will vary according to local circum

stances: at some places, boats will be resorted to: at others, land carriage will be more convenient: often inclined planes will be used, and especially when the quarry will be on the flank of the valley, and above the work to be erected. Each peculiar case, therefore, will necessitate a local allowance for transportation; whilst the nature of the present estimate comports only with a general price. After due consideration we have adopted for transportation, loading and unloading included, $0.125 per six cubic feet of stone, weighing together about one thousand pounds.

Respecting lime, it abounds from Hancock to the Great Falls; but is of a doubtful quality for hydraulic works on the extent from the mouth of Little Wills' Creek to Cumberland. From the mouth of Little Wills' Creek to the mouth of Casselman's River, we have the following reasons to suppose that, in this distance, no lime fit for hydraulic works will be found. 1. On the Eastern side of the Alleghany no masses of limestone are met (as far as we know) above the mouths of Little Will's Creek and Savage River, which lie, within a few feet, on the same level. Some limestone has been found, however, above the level of the mouth of Savage River, but much mixed with silicious substances, which render it unfit for lime destined even to the most common work. 2. The mouth of Casselman's River being 380 feet higher than the level of the mouth of Little Wills' Creek, it is highly probable that, on the Western side of the Alleghany, and above this level, the line will partake of the silicious nature which is found on the Eastern side; an observation which might, perhaps, be applied as far down as the gap where the Youghagany breaks through Laurel Hill.

It must be remarked that, from Georgetown, D. C. to Pittsburgh, very little hope is entertained to find water-lime of any kind; it will, therefore, become indispensable to use the best common lime to be procured. And, considering how important for durability and fitness of the work, is the quality of this article, we think that the distance of transportation, and the expense attending it, ought not, in this case, to be taken too much in consideration; because a small economy upon such an essential element might involve greater expenses, and even injurious consequences.

We shall now present the hypothesis upon which has been predicated the price of this article.

Computing, from the number of locks which each section will require, the quantum of mason-work with mortar, to be executed on each section, it is found:

1. That the portion of canal, from the mouth of Little Wills' Creek to the summit-level, (15 miles,) will require alone as much mason work as the whole Eastern section (186 miles.)

2. That the portion, from the summit-level to the mouth of Casselman's River, (35¾ miles.) will receive as much mason work as the whole Western section, (85 miles.)

3. That, on the Western section, within a distance of 30½ miles from Pittsburgh, there will be but six locks; and within a distance

of 57¾ miles from the same place, twenty-four locks only; whereas fifty-four locks are to be erected between Connelsville and the mouth of Casselman's River, in a distance of 27½ miles, and along which there is reason to be apprehensive as to the quality of lime.

From all this we infer, that the quantum of mason-work to be executed from the mouth of Little Wills' Creek to the mouth of Casselman's (56½ miles,) where lime will have to be brought from distant parts, is equal to the quantum of mason-work to be done on the Western and Eastern sections, taken together, (271 miles.) and where lime is found within short distance. We infer, also, that, on the Western section, at the places where lime is abundant, there is little want of it; whereas, it is scarce, or at least of a doubtful quality, on the portion where it is most wanted.

Now, we compute, as follows, the prices of lime along the several sections of canal, and from them we will conclude a general price for the whole line.

EASTERN SECTION.

The bushel at the kiln - - -	$0.220	
Mean transportation, 6 miles, one cent per mile	0.060	
	0.280	
Waste during transportation, $\frac{1}{20}$ - -	0.014	
A bushel inspected, measured and delivered on the spot where used - - -	0.294	

Portion above the mouth of Little Wills' Creek.

The bushel delivered at Cumberland -	0.150	
Mean transportation, 22 miles, through ascending and difficult ground, two cents per mile, viz. one cent and a half for going loaded, and half a cent for returning unloaded	0.440	
	0.590	
Waste during transportation, $\frac{1}{10}$ - -	0.059	
A bushel, inspected, measured, delivered on the spot where used - - -	0.649	
Since the quantum of mason-work on this portion is equal to that of the Eastern section, a mean between $0.649 and $0.294 can be adopted as a common price, which price will therefore be - - -	0.471	$0.471

WESTERN SECTION.

The bushel, delivered at the kiln - -	0.120	
Mean transportation, 12 miles, one cent and a half per mile, viz. one cent for going loaded, half a cent for returning empty. Along the portion above Connelsville, the communications are difficult, and $\frac{2}{3}$ of the mason-work are to be executed on it -	0.180	
	0.300	
Waste during transportation, $\frac{1}{15}$ - -	0.020	
A bushel inspected, measured, and delivered on the spot where to be used - -	0.320	

CASSELMAN'S PORTION.

The bushel delivered at the kiln - -	0.120	
Mean transportation, 22 miles, two cents per mile, for the same reasons as stated for the portion above Little Wills' Creek -	0.440	
	0.560	
Waste during transportation $\frac{1}{10}$ - -	0.056	
A bushel inspected, measured, and delivered on the spot where to be used - -	0 616	
The quantum of mason work being the same on this portion as on the Western section, a mean can be adopted between $0.616 and $0.320 as a common price, which will therefore be - - - -	0.468	0.468

From the foregoing computations, we might assume $0.471 for the price of lime on the line West of the Alleghany, and $0.468 for the price, referring to the lime on the Eastern side. But we want a general price for the whole line; and we adopt 48 cents as a mean, in round numbers.

These data being granted, the following will be the prices relating to masonry.

15.—A cubic yard of mortar - -		6.520
One bushel of unslacked lime, equal to 1 cubic foot 0.422 cubic inches, has been assumed at	0.480	
Waste during the making of mortar, $\frac{1}{24}$ -	0.020	
	0.500	

One cubic yard, at this rate, will cost -		10.854
Ditto, of sand, - - -		0.300
Ditto of water - - -		0.060
2½ cubic yards of lime -	$27.135	
5 ditto of sand -	1.500	
1 ditto of water -	0.060	
	$28.695	
These materials, if of good quality, and well worked together, will yield 5.40 cubic yards of mortar; a cubic yard will, therefore, cost as to materials - - -	5.313	
Add for labor, tools, and implements,	1.207	
	6.520	

The labor is estimated as follows, and from actual experiments.

48 days' labor for 40 cubic yards, -	48.000
Tools and implements - - -	0.300
For 40 cubic yards - -	48.300
For one ditto - - -	1.207

16.—Stone for a cubic yard of masonry, delivered on the spot where it is to be used $2.750

The stones must be hammered on their beds and joints as to produce a range work, and obtain joints tight enough to spare mortar, whose value is more than double that of stone. The courses, for the same reason, are to be at least 8 inches thick.

Quarrying of 30 cubic feet of rock, (mean price between Nos. 7 and 8) - -	$0.833
Splitting and shaping - - -	1.000
	1.833

These 30 cubic feet will yield 24 cubic feet of stone perched, the waste being more than 6 cubic feet.

24 cubic feet of stone, perched, will make 22 cubic feet of masonry, which will, therefore, cost - - - - -	1.833
And 27 cubic feet of masonry, for stone only, will cost - - - - -	2,250
Transportation at the rate of $0.125 per six solid cubic feet, about - - -	0.500
	2.750

17.—One thousand bricks delivered on the spot - - - - - $6.270

These bricks are chiefly to be used for the walls, arches, and shafts of the tunnel, as also for the bottom of locks and aqueducts. They must be of the best quality, hard burnt, and well shaped. Their dimensions are supposed to be 8, 4, and 2 inches. It is expected that good clay may be found at the average distance of 800 yards from the shafts, through which these materials are to be lowered down into the tunnel.

From informations upon which we place full reliance, a kiln of 100,000 bricks, does not afford more than 60,000 sound hard burnt bricks.

One thousand of these bricks will cost at the kiln - - - - -	5.000
One cubic foot of this material contains 27 bricks, and weighs 125 pounds; $7\frac{1}{2}$ cubic cubic feet, or $202\frac{1}{2}$ bricks weigh 937 pounds. A cart with one horse, at the rate of $1.88 a day. (No. 12.) will transport, at the distance of 400 yards on an ascent of $\frac{1}{20}$, 18 times $202\frac{1}{2}$ bricks, or 3.645. The transportation of one thousand at the distance of 800 yards on an ascent of $\frac{1}{20}$ will therefore cost - - - -	1.020
Loading the bricks into the baskets, lowering them down through the shafts, transporting them along the interior of the tunnel, computed per thousand - - -	0.250
	6.270

18. A cubic yard of stone masonry - - - 5.818

Range work, chiefly used for locks and aqueducts:

For stone (No 16.) - - -	2.750
For mortar, in its soft state, at the rate of 6.52 the cubic yard, (No. 15.) 0.25 cubic yard - - - - -	1.630
A good mason, paid $1.67, will lay, in ten hours, 86 cubic feet of this masonry: the laying of one cubic yard will, therefore, cost - - - - -	0.525
Two attendants for each mason, the average total elevation of the work being assumed 14 feet. These attendants will receive, together, $2 for 86 cubic feet, and for one cubic yard - - - -	0.628
To superintend the work, and ensure its faithful execution, scaffolds, implements,	

unforeseen loss of time - - -	0.285
	5.818

Nota.—At this rate, the perch of 25 cubic feet, will cost $5.385.

19. A cubic yard of brick walls, - - - $8.362
Chiefly used for the tunnel.

In a cubic yard of this masonry	607 bricks.	
Add for loss, $\frac{1}{20}$ - - -	31	
	638 bricks.	
638 bricks at $6.27 one thousand, (No. 17,)		4.000
0.1666 cubic yard of mortar, at $6.52 a cubic yard, (No. 15.) - - -		1.086
Transportation of this mortar, through the shafts, to the spot, computed - -		0.029
The work having to require peculiar care, the mason having to work by lamp-light; the spot being uncomfortable, we assume $1.90 for ten hours' labor, and 800 brick for the work done during this time: the laying of 607 bricks will therefore cost -		1.441
Three attendants for each two masons employed, besides, in filling up the space between the wall and the excavation, their wages, for reasons above stated, will be higher than usual: we assume $1.125 for each, and for ten hours' labor. These three attendants will therefore receive, together, $3.375 for the laying of 1600 bricks, and for 607 bricks - - - -		1.280
Lighting for eight hours, about, computed -		0.250
To superintend the work, and ensure its faithful execution, scaffolds, implements, unforeseen loss of time - - -		0.276
		8.362

Note.—At this rate, the perch of 25 cubic feet, would cost $7.742.

20. A cubic yard of brick arches - - $10.382
Chiefly used for the tunnel and shafts.

Bricks (No. 19.) - - - -	4.000
Mortar 0.1874 cubic yard, at $6.52 a cubic yard (No. 15) - - - -	1.222
Transportation of this mortar through the shafts - - - - -	0.032
	5.254

Brought over, - - - -	5.254	
Taking into consideration the nature of the work, the contracted space in which it is to be done; the frequent shifting of the scaffolds, one mason will lay but 500 bricks in ten hours. The laying of these bricks will cost $1.90, (No. 19,) and for 607 bricks - - - - -	2.306	
Three attendants for each two masons employed, besides shifting the scaffolds, in filling up the spaces between the arches and the excavation. They will receive, together, $3.375 for 1,000 bricks, and for 607 bricks - - - -	2.049	
Lighting, computed at - - -	0.300	
Clay and other materials to fill up the space between the arches and the excavation.	0.200	
To superintend the work, and ensure its faithful execution, scaffolds, implements, unforeseen loss of time - - -	0.273	
	10.382	

Note.—At this rate, the perch of 25 cubic feet would cost $9.613.

21. A cubic yard of water lime cement -		21.497
A bushel of water lime, equal to 1 cubic foot 422 cubic inches, delivered at Washington city, or at Pittsburgh, is assumed at -	0.600	
Transportation to the spot where to be used, averaged at - - - -	0.700	
	1.300	
Waste during transportation, and the making of cement, $\frac{1}{15}$ - - - -	0.086	
	1.386	
One cubic yard, at this rate, will cost -	30.076	
One ditto of sand - - - -	0.300	
Water - - - - -	0.060	
	30.436	
These materials will yield 1.5 cubic yard of cement; a cubic yard will, therefore, cost, as to materials - - - -	20.290	
Add for labor, tools, and implements (No. 15,)	1.207	
	21.497	

Note.—This article is so dear, that it has only been used, in the estimate, for the masonry of the tunnel below the water line, for the bottom and facing of the locks. During the construction of the canal, judicious experiments will, most likely, procure a substitute for it, and at a comparative cheap rate.

22.—A cubic yard of brick arches with water lime cement - - - -		$13.327
Used, only, for the masonry of the tunnel below the water line.		
The price (No. 20,) - - -	10.382	
Deduct mortar - - - -	1.222	
	9.160	
Add 0.194 cubic yard of water-lime cement at $21.497 (No. 21,) a cubic yard -	4.167	
	13.327	
23. A cubic yard of brick arches, with water-lime cement, for the bottom of locks and aqueducts - - - -		9.980
1,000 bricks at the kiln (No. 17) - -	5.000	
Transportation (No. 17) - - -	1.020	
	6.020	

In a cubic yard - -	607 bricks	
Add for loss, $\frac{1}{20}$ - -	31	
	638 bricks	
638 bricks, at the rate of $6.020 one thousand, will cost - - - -		3.840
Water-lime cement, (No. 22,) - -		4.167
A mason paid $1.67, can lay 800 bricks, the laying of 607 will, therefore, cost - -		1.267
Two attendants, at $1. each, for three masons; or $2. for the laying of 2,400 bricks: for 607 bricks - - -		0.506
To superintend the work, and ensure its faithful execution, unforeseen loss of time -		0.200
		9.980

24. A cubic yard of dry walls, made of large blocks, for the portions of canal where the walls will have to resist the current of the stream, - -		$4.02
Deduct mortar, and the attendants, from (No. 18,) - - - -	$3.560	

Brought over, - - -	3.560
Add for attendants the $\frac{3}{4}$, about, of $0.628, (No. 18,) - - - -	0.463
	$4.023

The greatest elevation of the walls is assumed at 24 feet.

Note. At this rate, the perch, of 25 cubic feet, would cost $3.725.

In forming the estimate, $4 only has been applied; but, on the other hand, $4.5 has been sometimes used, when it was thought that some mortar would be necessary.

25. A cubic yard of dry wall, made of large blocks, for walls having to resist the current of the stream, the stones being on the spot and convenient, - $3.000

Price assumed by deducting $1.023 from the preceding.

Note. At this rate, the perch, of 25 cubic feet, would cost $2.777.

26. A cubic yard of common dry walls, the stones furnished out of the excavation of the canal, and their price carried into the cost of such excavation, - $1.400

The mason, (No. 18,) - - -	$0.525
The attendants, (No. 18,) - - -	0.628
To superintend the work and ensure its faithful execution, scaffolds, unforeseen loss of time,	0.247
	$1.400

Note. At this rate, the perch, of 25 cubic feet, would cost $1.30.

CUT STONE MASONRY.

27. A cubic yard of sandstone, transportation included, blocks not exceeding 9 cubic feet content, - $13.500

A cubic foot (price of Baltimore,) -	$0.400
Add for destruction by frost $\frac{1}{4}$, - -	0.100
	$0.500
A cubic yard, - - - -	13.500

Note. Used only for the mitre sills, hollow quoins, recesses, and abutments of the gates of locks.

28. A cubic yard of limestone, transportation included: blocks not exceeding 9 cubic feet content, - $16.875

A cubic foot (price of Baltimore,) -	$0.500
Add for destruction by frost $\frac{1}{4}$, - -	0.125
	$0.625
A cubic yard, - - - -	16.875

Note. Same remark as above.

29. A cubic yard of limestone, transportation included: blocks above $\frac{1}{3}$ of cubic yard, and not exceeding one cubic yard, - - - - - $27.000

A cubic foot (price of Baltimore,) - -	$0.800	
Add for destruction by frost ¼, - -	0.200	
	$1.000	
A cubic yard, - - - -	27.000	

Note. This price has not been used in the estimate.

30. The square foot of cutting sandstone to the point, (price of Baltimore,) - - - -	$0.080
31. The square foot of cutting sand stone to the chisel, (price of Baltimore,) - - - -	0.120
32. The square foot of cutting limestone to the point, (price of Baltimore,) - - - -	0.182
33. The square foot of cutting limestone to the chisel, (price of Baltimore,) - - - -	0.264
34. The setting of cut-stone, with common mortar, a cubic yard, - - - - -	5.290

It is found that 253 cubic yards will require 485½ days' labor, at 2 dollars each.

A cubic yard will cost - - -	$3.837	
Mortar 0.16, - - - -	1.043	
Scaffolding, unforeseen loss of time, -	0.410	
	$5.290	
35. The setting of cut-stone with water line cement, a cubic yard, - - - - -		$7.900
Deduct mortar from (No. 34,) - -	$4.247	
Water lime cement 0.17, - - -	3.653	
	$7.900	

Such are the prices upon which have been predicated the estimates which are annexed to the following part of the present report.

PLAN AND ESTIMATE OF THE CANAL.

The transverse section of the canal is exhibited on the sheet No. 3. The breadth at the bottom is 33 feet; at the surface, 48 feet; the depth of water, 5 feet; the tow-path, 9 feet wide; the guard banks, 5 feet at the top; the surf berms, kept on the level of water, 2 feet wide each; the tow-path, and top of the guard bank, 2 feet above the surface of the canal.

This transverse section is to be modified where local circumstances require it; and, more especially, in the cases of deep cutting, steep side cutting, embanking, and, also, where the canal is supported by walls. In the framing of the plan, a due attention has been paid to these modifications, with a view to conciliate the convenience of the work with the strictest economy. The depth of 5 feet has been preserved throughout the line, but the breadth has been often much lessened. As to the surf berms, they are intended to protect the slopes

from being washed off, as also to lessen the resistance opposed to the boat, by affording to the eddy water a free passage.

We must submit, however, the reasons which led us to propose the above dimensions.

The experiments made in 1775, by the French Academicians (D'Alembert, Condorcet, and Bossut.) have shown: 1. That the resistance of water to the perpendicular motion of a given plane, may be regarded as proportional to the square of the velocity; 2. That, the velocity being the same, the resistance of water may be considered as proportional to the area of the plane; 3. That these results obtained only in the case of an indefinite expanse of water; 4. That, in narrow canals, the resistance increases in a more rapid ratio than the square of the velocity.

To attenuate, as much as practicable, this inconvenience, researches have been made to ascertain what should be the ratio between the transverse section of the canal and the transverse section of the boat, in order that the boat might move through such a canal, as through an indefinite expanse of water. Experiments made on the subject, by the celebrated Chevalier Dubuat, have shown that, to attain this result, the cross section of the canal ought to be, with moderate velocities, $6\frac{46}{100}$ times the cross section of the boat, and the water line $4\frac{1}{2}$ times the breadth of the boat.

Adopting, to preserve uniformity, $13\frac{1}{2}$ feet for the breadth of the boats used on the Chesapeake and Ohio Canal, [which is the breadth of the Erie Canal and of the Ohio Canal boats;] if we suppose the draft to be three feet, the prow to be rectangular, and the sides and bottom of the boat to conform to it, the cross section of the boat will be 40.5 square feet. Taking, now, this area $6\frac{46}{100}$ times, we find $261\frac{2}{3}$ square feet for the cross section of the canal, through which the boat would not meet with a greater resistance than through an indefinite expanse of water. The water line should be $60\frac{3}{4}$ feet, that is, four times and a half the breadth of the boat.

Were not expense to be taken into consideration, these dimensions might be recommended; but fitness of the work, and strict economy, must be reconciled as much as practicable, and it is in such a view that smaller dimensions are to be fixed upon.

It is to be remarked, that the distance from Georgetown to Pittsburg, in following the line of canal, is $341\frac{3}{4}$ miles, which, at the rate of $2\frac{1}{2}$ miles per hour, will be travelled in about - 136 hours.
The ascent and descent, amounting together to 3158 feet, will require, at the rate of 1 minute per foot, about 52

Distance, in time, from Georgetown to Pittsburg, 188 hours.

Though a number of canals, selected among those executed to this day, might afford together the distance and lockage found for the Chesapeake and Ohio Canal, yet there is not, within our knowledge, any line of the same extent requiring even 1800 feet of ascent and descent taken together: the Erie Canal requires 688 feet for 362 miles; the line from Liverpool to London, $1451\frac{1}{4}$ feet, for 264 miles; the canal

from the Rhone to the Rhine, connecting Lyons with Strasbourg, has about 1458 feet of lockage for a length of 200 miles. The proposed canal has, therefore, as to time, a decided inferiority, when compared to a canal of the same length, but having a less amount of lockage; and it becomes, in the present case, indispensable to remedy this inconvenience. The means we propose consists in the increase of the dimensions of the cross section of the canal, with a view to compensate, by a greater weight, [transported without additional power,] for the virtual increase of distance caused by so great an amount of lockage.

We have shown that this section ought to be 261 square feet, with a water line of 60 feet, to procure a boat 13 feet 6 inches in breadth the advantage of moving on the canal, as on an indefinite extent of water. After many trials and minute calculations we have concluded to adopt, for the contemplated canal, the $\frac{4}{5}$ of the foregoing results, viz: for the cross section, 208 square feet; and for the water line, 48 feet: and from these data we have framed, with a depth of 5 feet, the general transverse profile of the canal, as exhibited on the sheet No. 3.

Let us now compare this profile to one having 40 feet at the surface, 28 feet at bottom, and 4 feet in depth—the boat used being the same for both, and having $13\frac{1}{2}$ feet in breadth, and 3 feet draft.

We find, by calculations, that, the velocity remaining the same, the resistance to the boat moving in the 48 feet canal, is to the resistance to the same boat moving in the 40 feet canal, as 1.21 to 1.58, or as 100 to 130. Therefore, at the same rate of velocity, 100 horses will, on the 48 feet canal, perform the same work as 130 horses on the 40 feet canal: and, with the same towing power, the weight transported on the 48 feet canal, will be to the weight transported on the 40 feet canal, as 130 to 100.

But the depth of the 48 feet canal being one foot greater than the depth of the other, let us examine what will be the comparative resistance of the boat being immersed 4 feet into the 48 feet canal, and but 3 feet into the other. We find, in this case, the ratio to be 1.47 to 1.58, or 100 to 107; and we infer from it that, with a gain of about seven per cent. of towing power, the weight transported on the 48 feet canal will be one-third greater than the weight transported, during the same time, on the 40 feet canal.

The foregoing considerations show, that, in determining the transverse section of a canal of great length, and with a dividing summit level, the amount of lockage must have a due influence upon the breadth and depth of the water section. And, indeed, taking into view the great distance and considerable lockage belonging to the present case, a cross section, larger than that recommended, might have been suggested, had not a regard to economy, and to a competent supply of water during the dry season, forbidden it.

However, the transverse section, as just proposed, may be deemed sufficient to fulfil, in a satisfactory manner, the main requisite for which it has been intended. And, in order to remove all doubt, let us compare, as to amount of transportation, the contemplated Chesapeake and Ohio Canal with another of the same length, but whose

lockage would be 600 feet only, with a transverse section of 40 feet at the surface, and 4 feet in depth.

The rate of travelling being supposed, for both, $2\frac{1}{2}$ miles per hour, and one minute allowed for each foot of lockage, 60 feet will be, as to time, equivalent to $2\frac{1}{2}$ miles, and these canals will then compare as follows:

The Chesapeake and Ohio Canal having 3158 feet of lockage in a distance of $341\frac{3}{4}$ miles, is equivalent, as to time, to a single level canal of 473 miles, which would require 189 hours to be travelled from one end to the other.

The 40 feet canal, having 600 feet of lockage in a distance of $341\frac{3}{4}$ miles, is equivalent, as to time, to a single level canal of 367 miles, and which would be travelled in 146 hours from one end to the other. But it has been shown that, on the first canal, the amount of transportation being expressed by 130, it will be 100 on the 40 feet canal—the velocity and towing power remaining the same in both cases. Comparing, now, this ratio of 130 to 100, with that of the times employed to travel respectively each canal, viz: 189 hours to 146, it is found that these ratios are equal. Therefore, on either of these canals, and notwithstanding a difference of 2558 feet lockage, an equal weight will be transported during the same time, and with an equal towing power—a result entirely due to a larger transverse section having been assigned to the canal whose lockage is greater.

With a view to augment still more the amount of transportation, without increasing the expense attending it, the boat might have received a length of at least eight times its breadth; but it would have required a length of lock of 118 feet [between the hollow quoins,] which, on account of the great number of locks, would have caused too great an expense. The necessity of conciliating economy with the object to be expected from the work, has, therefore, obliged us to limit the length of the boat to seven times its breadth, $13\frac{1}{2}$ feet, it is to say to 94 feet about: this length varying, however, from 90 to 94 feet, according to the mode of constructing the boat. With a draft of 3 feet, such a boat, if rectangular, would displace about one hundred tons weight of water, or, on account of deviation from this form, about 90 tons only: it would carry a burden of 60 tons.

Respecting the locks destined to admit this boat, they must have at least 102 feet between the hollow quoins, and 14 feet breadth in the clear. In the estimate they are all supposed to be of eight feet lift, though, in the framing of a final plan, they should vary according to considerations not immediately connected with the object of the present report.

The sheet No. 3 exhibits the plan and sections of the lock upon which has been made the estimate of this article of expense. The main walls are built of common range work masonry, (No. 18;) their facing only is laid with water lime cement. Hewn stone has been used exclusively for the hollow quoins, mitre sills, abutments, and recesses of gates: the blocks do not exceed nine cubic feet, Nos. 27,

28. The bottom of the chamber consists chiefly of a reversed arch, built of brick, with water lime cement.

The estimate amounts to 13.069\frac{80}{100}$. But we must take into consideration that a number of locks will have their foundation upon solid rock, and will therefore require less masonry; and, also, that, owing to the necessary declination which, in the final plan, the bottom of canal will receive, the amount of lockage will be less than it is in this general plan. Under these impressions, $12,000 has been deemed a fair average cost of a lock on the whole line of canal.

Respecting the aqueducts, they are to be built of masonry, and their lengths calculated to afford a free passage to the streams at the time of freshets: they are generally to be connected with the sides of the valley by means of embankments carefully made.

We now pass to the description of the canal.

EASTERN SECTION.

* From Cumberland to Georgetown the valley of the Potomac is rapid, and its sides formed of a succession of bluffs and narrow flats: the bluffs on one side being generally opposite to the flats on the other. The parts which offer the greatest obstacles to the location of the work, are those where the stream forces its way through the high ridges whose direction is transverse to the bed of the river: at these places the banks are steep, the stream much winding, and its velocity very great, owing to falls and rapids. Whilst the flats present no difficulty, the bluffs and steep parts oblige, absolutely, to have the canal supported by walls, whose height should place the work above the reach of freshets, and whose other dimensions should be calculated to resist the impetus of the stream. The freshets are from 15 to 30 feet in height, and the general fall of the river bed 3 feet nearly per mile.

To avoid the parts which, by their steepness, oppose the greatest difficulties to the location of the canal, the crossing of the stream in order to place the work on each bank alternately, is the first idea which presents itself. But the adoption of such a system would lead into the difficulties and great expenses attending the erection of permanent and solid aqueducts across the Potomac; and, also, would oblige to keep, in many places, the level of the canal at an elevation which would affect materially the other requisites of the work.

After due investigations upon this subject, we remain convinced that it is more expedient, less expensive, and liable to less accidents, to keep, without deviation, on the same side of the valley; and the Maryland side has received the preference for the following reasons: the obstacles are generally of less magnitude than on the Virginia side; the exposure is more favorable, and will cause, in the Spring an earlier, in the Fall a later, navigation: no aqueduct will become necessary at Cumberland, since Wills' Creek empties into the stream on the Maryland side. However, all possible precautions have been

* General Map, No. 1. Sheet A, No. 15.

taken to accommodate the commerce of Virginia, and prevent that it should suffer from this arrangement.

The following table will show the resources of water upon which we rely to feed the Eastern Section of the contemplated canal. All the main tributaries of the Potomac, below Cumberland, will be required to accomplish this object; they have been gauged during the Summer of 1825, and the quantities of water presented by the table are minima upon which full reliance can be placed:

Virginia side.	Supply.	Maryland side.	Supply.	Distances from Western end.
	Cubic feet per second.		Cubic feet per second.	Miles.
		Evitt's Creek, -	5.55	3
South Branch, -	60	-	-	17
Great Cacapon, -	30	-	-	52
		Licking Creek, -	20	69
		Gt. Conococheague	20	85
		Antietam, -	25	116
Shenandoah, -	100	-	-	124
		Monocacy, -	166	144
		Seneca, - -	30.80	164
	190		267.35	

Together, $457\frac{35}{100}$ cubic feet per second.

The total length of the Eastern Section being 186 miles, this supply of water will be sufficient, provided a proper distribution should be made of it along the line of canal; and a constant regard has been bestowed upon this important object, during the framing of the following general plan of the work:

*Subdivision 1st.** From Cumberland to the South Branch of the Potomac:

Distance, $17\frac{1}{2}$ miles—descent, $83\frac{5}{10}$ feet—11 locks.

This subdivision commences at about one mile below Cumberland, and 34 feet above low water mark in the Potomac: the first level of the bottom of the canal is assumed 31 feet above said low water mark. This high level is required in order to be able to pass the neck of land across the great bend of the river, six miles below.

This level is preserved as far as the Narrows, where it is proposed to locate a series of eight locks, with intermediate ponds, occupying one mile, and having a descent of $62\frac{1}{2}$ feet. For the first three miles of this level, no provision is now made for a feeder, as it has to depend upon the Middle Section. A feeder is proposed from Evitt's Creek.†

* Sheets A, No. 1, 8.

† Sheet A, No. 13.

This plan will render necessary a deep cut of 25 feet in depth, and seven-eighths of a mile long; but this is preferred to continuing the canal parallel to the river at the great bend, and at an expense of several miles more in distance. Another cut, at Evitt's Bluff, one-eighth of a mile long and 22 feet deep, will be necessary, as also an aqueduct and an embankment across the valley of Evitt's Creek.

In the location of the locks, and the assumption of the level below, the probability of an additional feeder from the Potomac, at some future time, has been anticipated, and the work has been planned so as to facilitate this object if found necessary. The same consideration has been kept steadily in view along the whole line, which has been adapted, not only to its immediate efficiency, but also to the improvements which may hereafter be found necessary or expedient.

From the Narrows to Alum Hill, the only difficulty of importance is Braddock's Hill. At a short distance above Alum Hill, it is proposed to descend into the river 21 feet, by three locks, and continue in the stream about three miles, to the mouth of the South Branch, the tow path following along the shore. By this arrangement, we avoid the difficult ground on the left bank, or the alternative offered of crossing over to the right bank and back again.

A dam of 12 feet high, above low water mark, and erected on a suitable ledge of rocks, about one-quarter of a mile below the mouth of the South Branch, will afford a sufficient depth of water at the outlet of the locks near Alum Hill. This dam will, besides, procure the most effectual and economical means of introducing an additional supply of water from the main Potomac and its South Branch united, and also afford a convenient basin for the trade of the latter river. This dam would still remain useful for all these purposes, should, hereafter, an independent canal be adopted instead of using the river on this portion of the line.

This subdivision, from its Western end to the point where the canal descends into the Potomac, that is, on a distance of 13 miles, receives the waters of Evitt's Creek only, which would not be sufficient to feed the canal. But, as it will be seen further, the Middle Section will supply what is wanting now.

According to the estimate hereto annexed, this subdivision will cost $524,380 54.

*Subdivision 2d.** From the South Branch of the Potomac to the mouth of the Great Cacapon river:

	Distance,	descent,	8 locks.
From Cumberland,	52¼	147½	19

This subdivision commences about a quarter of a mile above the dam across the river, a short distance below Oldtown Bluff, and nearly opposite the mouth of the South Branch. The canal will pass out of the basin by means of a guard lock, and will require, for some distance below, to be protected by an embankment.

* Sheets A, No. 1, 2, 8, 9.

For the first three miles, the ground continues favorable for the canal, until it has passed Town Creek, after which the declivities of Gregg's Mountains offer considerable, but not very formidable, difficulties, for three miles further. It again becomes quite easy for more than two miles, after which, in approaching the neighborhood of Paw-paw Ridge, the difficulties gradually increase until they reach an extent that is truly formidable, and will require all the resources of art to successfully overcome them. In planning this portion, several alternatives presented themselves: either of continuing on one bank the whole distance, or of taking advantage of the most suitable ground on both banks by crossing from one to the other by an aqueduct. This latter plan was, after attentive consideration, rejected, from the difficulty of securing the aqueduct from injury by the violence of the stream, and even of placing it above the freshets, without materially interfering with and deteriorating the works as planned for some distance above.

It was, therefore, deemed more expedient to continue the work on the Maryland side, notwithstanding the serious obstacles presented in the next seven miles; indeed, the expense to overcome them will be great, but we feel confident that the security of the work will be perfectly ensured.

Below the difficult pass of the Paw-paw Ridge, the ground becomes more favorable, and continues so to the end of this subdivision, with the exception of some small portions amounting together to about 3 miles, and offering considerable difficulties, though affording in several places the conveniences required for the location of locks and other works proposed.

This subdivision will be fed by the waters of the Potomac, and those of the South Branch, collected in the basin above the dam already mentioned.

This subdivision will be very expensive; its probable cost amounts, in the estimate hereto annexed, to $1,464,372 97.

*Subdivision 3d.** From opposite the mouth of the Great Cacapon to the mouth of Licking Creek:

	Distance, 16½ miles—	descent, 32 feet—	4 locks.
From Cumberland,	68¾	179½	23

At the beginning of this subdivision a supply of water will be required, and it is contemplated to procure it from the Great Cacapon River, (Virginia,) by means of an aqueduct across the Potomac.† Several circumstances concur in suggesting this as the most expedient plan of accomplishing the object. Indeed, we might have had recourse to the Potomac itself, but this plan would have required that the canal should descend into the bed of the stream, that a dam across the river and a guard lock at the debouch of the canal should be erected, and a long embankment raised to shelter the canal from the

* Sheets A, No. 2, 3, 9. † Sheet A, No. 13.

freshets. These considerations led us to give preference to the aqueduct feeder as both more convenient and more economical.

This subdivision offers but little difficulties in its execution, when compared with those immediately above and below. The canal interfering, below Hancock, for some distance, with the turnpike, a provision has been made in the estimate for removing the road further on the hill side.

This subdivision is estimated at $415,794 20.

*Subdivision 4th.** From the mouth of Licking Creek to the Great Conococheague.

	Distance, 16¾ miles—descent, 38 feet—5 locks.		
From Cumberland,	85½	217½	28

At the beginning of this subdivision, a feeder is necessary from Licking Creek, to supply with water this portion of canal.†

The ground is favorable for the first seven miles, as far down as Prater's Neck, where a moderate deep cut will afford an opportunity scarcely to be found on any other part of the river, of passing through the neck of an isthmus, instead of following the circuitous bend of the stream. As some difficult ground is thus avoided, this plan will combine the two advantages of shortening the distance and lessening the expense.

But, immediately below this point, there is one of the most difficult and expensive passes to be encountered. High and precipitous cliffs of limestone rock present close to the river their almost perpendicular sides; and for a distance of three miles, the canal must be supported in great measure by a wall, whose structure and strength must be adequate to resist the violence of the stream during the freshets, and withstand the shock of drifted timber and masses of ice.

Indeed, the ground on the Virginia shore, immediately opposite to this pass, is of a favorable character, but it soon becomes also very difficult; so that, on the supposition of the canal being carried over to it by means of an aqueduct, a second crossing would be found necessary within a short distance below. The inexpediency of such a plan is too obvious to deserve any further consideration.

After passing this section, the ground, as far down as Williamsport, does not offer any great obtacles, excepting, however, for a mile immediately below the warehouse, and also between three and four miles from Williamsport. Here considerable walling will be necessary, a part of which being at the very bend of the river, must be of great strength to resist the violent efforts to which it will be exposed.

The estimated cost of this subdivision amounts, according to the estimate hereto annexed, to $942,386 50.

Subdivision 5th.‡ From the Great Conococheague to the mouth of the Antietam.

	Distance, 30½ miles—descent, 35 feet—5 locks.		
From Cumberland,	116	252½	33

* Sheets A, Nos. 3, 4, 10. † Sheet A, No. 13. ‡ Sheets A, Nos. 4, 10, 11.

Williamsport, situated at the mouth of the Great Conococheague, is the centre of trade of a considerable portion of fertile country; it will, therefore, require a basin for its accommodation. This work is consequently introduced in the plan, and the expense has been calculated on the supposition of the sides being formed of stone instead of timber, on account both of durability, and health of the neighborhood. Here, as has also been done at other points, locks are proposed to communicate with the Potomac. This arrangement is indispensable whenever there is, for some distance, a tolerable navigation in the river itself, in order to enable the Virginia shore to participate fully in the advantages of the canal, advantages which otherwise would be bestowed exclusively on the Maryland side. Thus, to the expense attending the construction itself of the canal, we add in full all the contingencies relating to a liberal accommodation of the trade of the Virginia shore.

The extraordinary winding course of the river, on this subdivision, renders the line of canal very circuitous: the direct distance between Williamsport and the mouth of the Antietam being but about 13 miles, whilst the route pursued will be 30½ miles. For the first ten miles there are no serious obstacles to encounter; though several steep hill sides and rocky points are met with, yet they may be overcome without much difficulty. But, immediately below, is found again one of those formidable passes which, in spite of all the efforts of art, render this work so difficult and expensive: for about 2½ miles at the bend of the river, near Galloway's mill, high and almost perpendicular rocks come down to the water's edge; they will render indispensable, for nearly the whole distance, the erection of walls to support the canal; walls which, being much exposed to the shocks of ice and timber, will require the greatest strength practicable.

The ground on the Virginia shore opposite to this pass is, indeed, of a favorable character; and it was duly considered whether it might not be more expedient to take advantage of it by crossing the river. But the objections urged against the adoption of such a plan, in similar situations above, also obtain here, and render preferable the course adopted.

A feeder from the Great Conococheague* will be necessary at the beginning of this subdivision: but an additional supply of water will become indispensable before reaching the Antietam, and the Potomac itself is the only stream which can be resorted to. To fulfil this object, a dam of moderate height is proposed, about a mile below Galloway's mill, as also a short feeder to carry the water into the canal lowered down for the purpose: the dam will be furnished with a lock to prevent the navigation of the river from being interrupted. It must be remarked that the localities are not very favorable to this plan, inasmuch as the canal thus constructed, will, in consequence of the gentle descent of the river, have to be protected from the freshets by embankments for more than six miles below. However, by a careful

* Sheet A, No. 14.

adaptation to the ground, these embankments will not be very formidable and will be rendered perfectly secure by means of paving.

In the course of the next thirteen miles below the dam, difficult and favorable portions alternate; but the former are not by any means to be compared to those above.

Opposite Shepherdtown, provision has been made for a communication with the river by means of four locks descending 29 feet; the object is, to accommodate the trade of this place and of the surrounding country.

From opposite Shepherdtown to the Antietam, less than four miles, the ground is favorable, with the exception of one hill side offering some side cutting, but neither of any difficulty, nor of great extent.

According to the estimate hereto annexed, the estimated cost of this subdivision will amount to $1,572,898 54.

Subdivision 6th * From the mouth of the Antietam to one mile below Harper's Ferry.

	Distance,	9 miles--descent,	72 feet--9 locks.
From Cumberland,	125	324½	42

On the Antietam, and at the beginning of this subdivision, there exist valuable and extensive iron works, which should be preserved if possible. They are so situated that any feeder taken from this river would cut off, during the dry season, the supply of water upon which they depend. Therefore this subdivision has to rely chiefly upon the Potomac taken below Galloway's mill, though a feeder from the Antietam will bring into the canal the surplus of the water not necessary for the iron works.

The first seven miles bring the canal to the head of Harper's Ferry Falls. The line, for this distance, presents a succession of alternate steep rocks and hill sides, intermixed with some portions of favorable ground: the whole will require a considerable amount of walling and excavation.

The difficulties of the pass at Harper's Ferry exist in a distance of three miles: for the whole length a wall of greater or less height will be necessary; but as, generally, there is a sufficient ledge to lay its foundation above low water mark, it will not be so expensive as might have been anticipated. Advantage also may be taken of the large masses of rocks which lay near at hand, and which, being moved by suitable machinery, may be made subservient to an important purpose.

As the Shenandoah,† which empties into the Potomac at Harper's Ferry, runs through a fertile and extensive valley, and is navigable for a considerable distance, it becomes important to secure its connection with the canal. The plan proposed to effect this object consists of a dam erected at the most suitable spot below the junction of the two rivers. A basin will thus be obtained to accommodate the trade of the Shenandoah, and to collect the waters of both streams in order to procure a large supply to the canal; a short navigable feeder, provided

* Sheets A, Nos. 4, 11. † Sheet A, No. 14.

with a guard lock, will unite the basin with the canal. Besides these last advantages, the plan will preserve from injury the extensive manufactories which exist on both of the streams.

The estimate of this subdivision amounts to $747,781 10.

*Subdivision 7th.** From one mile below Harper's Ferry to the mouth of Monocacy river.

	Distance, $19\frac{1}{8}$ miles—	descent, 24 feet—	3 locks.
From Cumberland,	$144\frac{1}{8}$	$348\frac{1}{2}$	45

The beginning of this subdivision will be difficult and expensive, on account of the excavation of rock which the navigable feeder from the Potomac will require, and also on account of the strong and costly works to be erected, for the security of the canal, at the place where it is let down to receive the navigable feeder.

For the first two miles, the line of canal passes alternately over a favorable portion of ground, then along a rocky hill side of some difficulty. The next eight miles are on easy ground; but, a short distance below Cotoctin creek, the Cotoctin mountain approaching close to the river offers an obstacle of some importance, though less difficult than those described above. From the Cotoctin ridge to the Monocacy, about $6\frac{1}{2}$ miles, the ground is favorable, with the exception of one small portion, where a deep cut will be necessary.

According to the estimate hereto annexed, the cost of this subdivision will amount to $496,262.

Subdivision 8th.† From the mouth of the Monocacy to the mouth of Seneca Creek.

	Distance, $18\frac{7}{8}$ miles—	descent, 24 feet—	3 locks.
From Cumberland,	163	$372\frac{1}{2}$	48

This subdivision commences with a long and expensive aqueduct over the Monocacy; and is to be supplied by the preceding subdivision and by the Monocacy.‡ To this effect, a feeder is proposed from this river, and is supposed navigable with a view to any future improvement along the valley of the Monocacy.

The first five miles of this subdivision extend as far down as Peters' quarry; they will require a large portion of hill-side cutting, and some walling, which will render this portion expensive.

The remaining 14 miles are unusually favorable, being generally through extensive meadows, where the gradual inclination of the ground affords the opportunity of choosing the level of the canal, and thus obtaining nearly the minimum of excavation.

The estimate of this subdivision amounts to $511,900 40.

* Sheet A, Nos. 5, 11. † Sheet A, Nos. 5, 6, 11, 12. ‡ Sheet A, No. 14.

with a guard lock, will unite the basin with the canal. Besides these last advantages, the plan will preserve from injury the extensive manufactories which exist on both of the streams.

The estimate of this subdivision amounts to $747,781 10.

*Subdivision 7th.** From one mile below Harper's Ferry to the mouth of Monocacy river.

	Distance, $19\frac{1}{8}$ miles—	descent, 24 feet—	3 locks.
From Cumberland,	$144\frac{1}{8}$	$348\frac{1}{2}$	45

The beginning of this subdivision will be difficult and expensive, on account of the excavation of rock which the navigable feeder from the Potomac will require, and also on account of the strong and costly works to be erected, for the security of the canal, at the place where it is let down to receive the navigable feeder.

For the first two miles, the line of canal passes alternately over a favorable portion of ground then along a rocky hill side of some difficulty. The next eight miles are on easy ground; but, a short distance below Cotoctin creek, the Cotoctin mountain approaching close to the river offers an obstacle of some importance, though less difficult than those described above. From the Cotoctin ridge to the Monocacy, about $6\frac{1}{2}$ miles, the ground is favorable, with the exception of one small portion, where a deep cut will be necessary.

According to the estimate hereto annexed, the cost of this subdivision will amount to $496,262.

Subdivision 8th.† From the mouth of the Monocacy to the mouth of Seneca Creek.

	Distance, $18\frac{7}{8}$ miles—	descent, 24 feet—	3 locks.
From Cumberland,	163	$372\frac{1}{2}$	48

This subdivision commences with a long and expensive aqueduct over the Monocacy; and is to be supplied by the preceding subdivision and by the Monocacy.‡ To this effect, a feeder is proposed from this river, and is supposed navigable with a view to any future improvement along the valley of the Monocacy.

The first five miles of this subdivision extend as far down as Peters' quarry: they will require a large portion of hill-side cutting, and some walling, which will render this portion expensive.

The remaining 14 miles are unusually favorable, being generally through extensive meadows, where the gradual inclination of the ground affords the opportunity of choosing the level of the canal, and thus obtaining nearly the minimum of excavation.

The estimate of this subdivision amounts to $511,900 40.

* Sheet A, Nos. 5, 11. † Sheet A, Nos. 5, 6, 11, 12. ‡ Sheet A, No. 14.

DETAILED ESTIMATE OF A TUNNEL, &c. [Sheet No. 5]—Continued.

CONSOLIDATED ESTIMATE.

	Excavation.		Masonry.		Draining.	Total cost.
	Cubic content.	Cost.	Cubic content.	Cost.		
	Cubic yards.	*Dolls. Cts.*	*Cubic yards.*	*Dolls. Cts.*	*Dolls. Cts.*	*Dolls. Cts.*
Shafts, - - -	38,704.52	109,935 95	21,499.70	123,097 00	159,469 30	392,502 25
Heading and side heading,	32,112.85	77,531 50	20,047.65	313,707 60	-	391,239 10
Tunnel, - - -	473,923.00	603,047 04	74,546.40	1,892,195 76	-	2,495,242 80
Total, - -	544,740.37	790,514 49	116,093.75	2,329,900 36	159,469 30	3,278,984 15

RECAPITULATION.

	Cost of excavation.	Cost of masonry.	Total cost, including incidental items.
	Dolls. Cts.	*Dolls. Cts.*	*Dolls. Cts.*
Shafts, -	97,560 95	110,722 00	233,032 95
Draining, -	-	-	159,469 30
Heading, -	75,463 90	308,070 93	383,534 83
Side heading,	2,067 60	5,636 67	7,704 27
Tunnel, -	603,047 04	1,892,195 76	2,495,242 80
Total cost of tunnel, 4 miles and 80 yards in length, the ground supposed to be slate rock and sand stone, -			3,278,984 15

S. BERNARD, *Brig. General, Member of the Board of Internal Improvement.*
WILLIAM TELL POUSSIN, *Capt. Top. Eng'rs* } *Assistants to the Board.*
WM. HOWARD, *Civil Engineer,*

* Sheet A, Nos. 5, 11. † Sheet A, Nos. 5, 6, 11, 12. ‡ Sheet A, No. 14.

*Subdivision 9th.** From the mouth of Seneca creek to the head of the Great Falls.

	Distance, 8¾ miles—	descent, 52 feet—	4 locks.
From Cumberland,	171¾	404½	52

This subdivision begins by an aqueduct across Seneca creek; and a feeder is taken in from this stream.†

The ground, for the whole distance, will require considerable walling and side cutting; but no serious difficulties are met with beyond mere expense of execution.

This subdivision will be supplied by Seneca creek, and will also receive a portion of the water furnished by the Potomac and Shenandoah.

The estimate of this subdivision amounts to $429,868 40.

Subdivision 10th.‡ From the head of the Great Falls to tide, below the Little Falls.

	Distance, 11¾ miles—	descent, 173 feet—	22 locks.
From Cumberland,	183½	578	74

The breaking of the Potomac through the granite ridge, at the Great Falls, presents, at first sight, difficulties of the greatest magnitude. The river gradually narrows its channel as it approaches its perpendicular pitch: at this point, and a little below, the width does not exceed one hundred yards, at a moderate stage of the stream. Here, the perpendicular rocks 60 or 70 feet high, forming the banks, the deep water at their foot, the violence and great rise of the freshets, render truly appalling the idea of supporting a canal along this pass by means of walls. Most happily, there is no necessity for such a plan: a ravine, or rather two ravines, which can be rendered continuous by comparatively little labor, extend for the whole distance between what is termed Bear Island and the high bluffs forming the Maryland shore.

This fortunate circumstance will not only enable to make the canal here at much less expense than through the pass of the stream, but it will also procure to the work a security which neither ingenuity nor expense could afford on the other alternative.

Below the Great Falls, the ground, with the exception of some portions of easy execution, is generally difficult, requiring a large extent of walling and of steep side cutting, for about seven miles: it is to say, as far down as the head of the actual canal round the Little Falls. This canal is to be used; therefore it is proposed to enlarge and improve it, as also to add some works for its security at its head, where it will form a valuable feeder.

At the end of this subdivision, five locks would be requisite to descend to the level of tide water, were the canal to terminate at this point; but, the distance to Georgetown being only 2½ miles, it is proposed to lower the canal down at Georgetown, and to locate there the

* Sheets A, Nos. 6, 12. † Sheet A, No. 14. ‡ Sheets A, Nos. 6, 7, 12.

five locks just mentioned. These five locks are, however, carried into the estimate of this 10th subdivision.

This subdivision will be supplied with water by a feeder from the Potomac above the Great Falls.

The estimate of this subdivision, according to the documents hereto annexed, amounts to $897,650 80.

Subdivision 11th. From the Little Falls to Georgetown.

	Distance, 2½ miles	—descent, 37 feet	—5 locks.
From Cumberland,	186	578	74

Although the instructions received were to terminate the canal at tide water in the Potomac, yet it has been thought that a small economy of two miles and a half of canal, through easy ground, was not to be compared to the great advantages of avoiding the navigation of the stream, and having the Eastern end of the canal at the Seat of the General Government. We have already stated that the lockage would not be increased by this arrangement, the five locks necessary to descend at the Little Falls being, in this case, removed to Georgetown, and there located. This portion has been made a separate subdivision, in order to afford the alternative of forming the connexion with the tide, either where it now exists, or at Georgetown.

The latter plan would facilitate the canal being made continuous to Washington, and in the direction of Baltimore. A basin, at Georgetown, between Bridge and Water streets, is proposed : its expense is introduced into the estimate, on the supposition of having this basin lined with stone.

As to the locks which at presen exist at the Little Falls, their being connected would offer, even if they were of the proper dimensions, a serious obstacle to an extensive trade passing through them, and would thus produce an inconvenience which has always been carefully avoided in framing the plan of the whole line. These locks should, however, be preserved, as they may be useful to other important purposes.

The estimate of this subdivision, exclusively of the 5 locks already taken into account, will amount to $173,285 60.

Summary of the Eastern Section.

Distance. Miles.	Descent. Feet.	Number of Locks.	Estimate. Dollars.
186	578	74	8,177,081 05

MIDDLE SECTION.*

This section includes the Summit Level, and extends from Cumberland (or rather from the Western end of the Eastern Section) to the mouth of Casselman's river, in the Youghagany. Its length is 70 miles 1010 yards, but a lockage of 1961 feet, and a tunnel of 4 miles 80 yards long, under a ridge of 856 feet elevation, will make this section extraordinarily expensive.

This section will, besides, require the erection of dams across the valleys through which it passes, and more especially into the bed of Wills' creek. This stream, in fact, affords, in Summer and Fall, a too small supply of water towards its sources, to rely altogether upon it: the summit level must feed, therefore, the upper portions, whilst frequent dams erected across the valley will make available the water delivered by the stream.

The valleys of Wills' creek and Casselman's river being formed of a succession of flats and bluffs, the canal will often require to be supported by walls, whose height should place the work out of reach of the freshets. These freshets rise, in Wills' creek, from seven to ten feet, and from twelve to sixteen feet in Casselman's.

In planning this section, care has been taken to avoid, as much as practicable, expensive aqueducts, and none is to be erected over Casselman's river; the canal will follow, constantly, the right side of the valley, whose Southern exposure will procure an earlier navigation in Spring, and later in Autumn. Respecting Wills' creek, its valley is so narrow at some places, and the height of freshets so inconsiderable, that four crossings have been made to take advantage of the most favorable ground, and thus lessen the expense. It must be observed, that these two streams are not navigable, and will, therefore, require no peculiar work to accommodate their trade and navigation.

The execution of the tunnel will be, not only very expensive, but also long and difficult; all the geological appearances lead to the conclusion that the excavation will have to be made through sandstone rocks. The estimate has been calculated for three different kinds of ground—hard clay, sandstone, granite, and unstratified limestone. The hypothesis of sandstone being admitted here, the estimate relating to this kind of ground accompanies the present report. [See Sheet No. 5.] The tunnel will require to be lined with masonry, experience having shown that this precaution is indispensable; brick masonry has been adopted in the estimate as the most convenient to fulfil the object. The dimensions of the interior of the tunnel are, 22 feet in width, 7 feet under the water line, and 16½ feet above the same line, which form 23½ feet from the bottom to the top of the arch; the tow-path is four feet wide. The shafts destined to facilitate the excavation, and to air the tunnel, are proposed to be sunk 180 yards apart, from centre to centre; their diameter will be six feet within the lining of brick masonry. A gallery, lateral and parallel to the tunnel, cor-

* Sheets M, Nos. 3, 4, 5, 6, 7.

responds with the shafts: this gallery, or heading, is destined to drain the tunnel during its excavation; its width is three feet, and its height 6½ feet; it is lined with brick masonry, and communicates with the tunnel by means of arcades, or side headings, which correspond to the points at which the shafts terminate into the heading. The Sheet No. 4, herewith annexed, exhibits all the drafts relating to this tunnel, and to the deep cuts at its ends.

The deep cut at the Western end is 1060 yards long, that at the Eastern 140 yards; each opens into a basin having 880 yards in length and 64 yards in width. The tunnel, the deep cuts, and the basins, form together the Summit Level, whose length will be 5 miles 1280 yards; a lock is located at each end, and where each basin terminates.

Let us now examine the resources upon which we can rely to supply with water this Summit Level, and the portions of canal contiguous to it. The stream upon which we have chiefly to depend, is Casselman's; it yielded, in 1825 and 1826, the following results:

June 21, 1825,	at Plucher's farm.	per second,	18 cubic feet.
July 10, 1825,	below Flaugherty's creek,		38
July 12, 1826,	at its mouth,		46
March 21, 1826,	at Plucher's farm,		98
March 27, 1826,	below Flaugherty's creek,		715
March 21, 1826,	at Forney's mill dam,		536

We have admitted, in the former part of the present report, 18 cubic feet per second, as the minimum of water yielded by Casselman's river, and we have also pointed out two reservoirs, one at Pleucher's farm, the other at Forney's mill, containing together twenty-two millions of cubic yards. These are the resources afforded by the localities to feed the Summit Level, and supply its lockage, and also portions of canal contiguous to the Summit Level.

The reservoirs are to be filled in Winter, during the interruption of the navigation; an interruption which, considering the elevation of the Summit Level above the Ocean, 1903 feet, cannot be supposed less than four months, viz from the first of December to the first of April. By adopting 98 cubic feet per second as the mean supply afforded in Winter by Casselman's river, at Pleucher's farm, we find that, in less than 72 days, both reservoirs would be filled up.

However, to remove any doubt on the subject, we will take an area of 36 square miles of ground whose rain water supplies Casselman's river, and make a computation of what such an area would yield: we will suppose it to be formed of two strips of land, each of 18 miles long and one mile wide, and stretching along the banks of Casselman's river above Forney's mill.

From observations made, from 1817 to 1824, inclusively, by Mr. Lewis Brantz, in the vicinity of Baltimore, we have the following results: in the course of these eight years, there fell on a mean average, yearly $39\frac{89}{100}$ inches of rain; in 1822, there fell the smallest quantity, which was $29\frac{20}{100}$ inches; the greatest quantity fell in 1817,

it amounted to $48\frac{55}{100}$ inches. Adopting these data for the country round the Summit Level, and using only the results of the year 1822, we find that the rain which fell in the three first and three last months of said year, amounted to $16\frac{70}{100}$ inches, and for the six other months, to $12\frac{1}{2}$ inches.

			Cubic yds.
These $16\frac{70}{100}$ inches are equivalent,	per square yard surface,	to	0.463
The $12\frac{1}{2}$ inches,	do	do	0.347
The whole, or $29\frac{20}{100}$ inches,	do	do	0.810

Applying now these last results to the area of 36 square miles above mentioned, we find that they will receive, at the minimum,

	Cubic yards.
During the Fall and Winter, - - -	51,630,796 80
During the Spring and Summer, - - -	38,695,219.20
The whole year round, - - -	90,326,016.00

From which it will be seen, 1st, That the two-thirds of the first quantity, or $34,420,531\frac{2}{10}$ cubic yards, would be about one-third more than will be necessary to fill up the reservoirs in four months; 2d, That 44 cubic feet per second would make up, during six months, the two-thirds of the second quantity, and might, therefore, be deemed the mean discharge, per second, of Casselman's river during Spring and Summer, instead of 18 cubic feet assumed in the present report; 3d, That this surplus will partly replenish the reservoirs during the time of navigation.

If to these considerations we add that, instead of 36 square miles, we might easily have taken the double, we may conclude that the filtrations and evaporations of rain water being taken into the most liberal account, the portion of the Casselman's valley above Forney's mill, will convey to the bed of this river more water than we have admitted.

We believe, therefore, that the minimum supply of the Summit Level will consist of, 1st, A reservoir of 22,000,000 cubic yards; 2d, 18 cubic feet per second of running water. And, since the navigation is supposed to be opened during eight months, the monthly resources will be—

	2,750,000	cubic yards from the reservoirs,
	1,728,000	from the river itself,
Total,	4,478,000	cubic yards per month.

Let us see now how will be regulated the use of this monthly supply. Taking into consideration the unavoidable delays at the ends of the Summit Level, the impediments at the debouches of the tunnel and through the deep cuts, and, finally, the greater resistance the boats will meet through the tunnel, we cannot suppose less than 3 hours 25 minutes for a boat to pass from one end of the Summit Level to the other, which comes to $1\frac{2}{3}$ miles per hour. But the passage is to be effected in convoy, on account of economy both of time and water, and we adopt 30 boats for each convoy, a number which in the present case

seems to us favorable to combine the time of passage with the supply of water during the same time. These thirty boats moving in convoy, will meet with more delay than would a single boat, and instead of 3 hours 25 minutes, as before stated, we assign 4 hours to the convoy to pass from one end to the other of the Summit Level.

We suppose, also, that a convoy of 30 boats, descending the Eastern lock of the Summit Level, and (through the same lock,) passing an ascending convoy of the same number of boats, will effectuate this cross passage in eight hours, under the plausible supposition that 16 minutes will be required for the cross passage of a boat ascending and one descending. A similar cross passage is supposed to take place at the Western lock of the Summit Level, and at the same time.

Now, a first convoy leaving the Eastern lock, will arrive four hours afterwards at the Western lock, and meet there a convoy coming from the West, and ready to proceed Eastwards. This second convoy will reach, in four hours, the Eastern lock, and find there a third convoy, having ascended the lock during the passage of the first and second convoys. This third convoy will proceed Westward, and arrive 4 hours after at the Western lock, where it will find a fourth convoy, having ascended the lock during the passage of the second and third convoys. Lastly, this fourth convoy will move Eastward, and reach, in 4 hours, the Eastern lock: meeting there with a convoy from the East, having ascended the Eastern lock during the passage of the third and fourth convoy.

The passage of these four convoys, forming together 120 boats, and requiring four hours each, may be considered, as will be seen just now, the maximum of trade which the supply of water can admit. At this rate of 120 boats a day, 3,600 might pass per month, and 28,800 during the eight months of open navigation.

Let us now compute the expense of water which the lockage of these boats will require. Admitting, as in fact it will be the case, that, at each lock, one ascending boat alternates with a descending one, each boat will draw, from the Summit Level, but one lockful, viz. half a lockful at each end. However, in order to provide for contingencies and unforeseen cases, we adopt one lockful and a half for the passage of each boat through the Summit Level. One lockful and a half containing 623 cubic yards, the 3,600 boats passing during one month, will require 2,242,800 cubic yards of water, which, being taken out of the monthly supply, amounting to 4,478,000 cubic yards, will leave 2,235,200 cubic yards. This last quantity is destined to feed the canal itself, exclusively of lockage, on a length of 18 miles, and at the rate of 120,000 cubic yards per mile and per month, absorption, filtration, and evaporation, being taken into account.

These eighteen miles comprehend the Summit Level, a portion of six miles in Wills' creek, and a similar of also six miles in Casselman's valley. The remainder of the canal down Wills' creek will be supplied by this stream, whilst Casselman's river will feed the remainder of the canal descending its valley.

The estimated cost of the Summit Level, just described, is as follows:

The Tunnel—		
Shafts, - - -	$233,032 95	
Heading, - - -	383,534 83	
Side Heading, - -	7,704 27	
Tunnel, - - -	2,495,242 80	
Draining, - - -	159,469 30	
Total cost of Tunnel, - - -		$3,278,984 15
The Eastern Basin, - - - - -		26,741 14
The Eastern deep cut, - - - - -		18,733 00
The Western deep cut, - - - - -		141,840 72
The Western Basin, - - - - -		5,668 00
Total estimate of the Summit Level, - - -		$3,471,967 01

The details relating to the estimate of the tunnel are exhibited in the Sheet No. 5, annexed to this report. As to the basins and deep cuts, their detailed estimates have been carried into those belonging to the Eastern and Western portions of this Middle Section. We shall now present successively the description of these portions: the Eastern commencing at the Eastern end of the Summit Level and terminating below Cumberland; the Western beginning at the Western end of the Summit Level and debouching into the Youghagany below the mouth of Casselman's river.

EASTERN PORTION.

*Subdivision 1st.** From the Eastern end of the Summit Level to the mouth of Little Wills' creek.

Distance, 15 miles 460 yards—descent, 1,016 feet—127 locks.

The canal follows, for 8½ miles, the left side of the valley of Wills creek; it then crosses the stream, to descend, for two miles, along the right bank; crossing again the creek, it remains on the left side as far down as the 14th mile; it then crosses a third time, to follow the right side of the valley as far down as opposite the mouth of Little Wills' creek.

The considerable descent in so short a distance; the contracted breadth of the valley; the steepness of its sides; the great quantity of excavation in rocky ground; will concur, together, to render this subdivision very expensive in proportion to its extent.

The distance between the heads of two consecutive locks will not be less than 180 yards.

The six first miles will be fed, as stated before, by the Summit Level; the remainder will be supplied by Wills' creek: to that effect, dams, erected at suitable places, will afford the means of taking into the canal, not only the waters of the creek, but also those of its tributaries.

The estimate of this subdivision amounts to (the Eastern basin and deep cut excluded,) $2,300,859 28.

* Sheet M. No. 5.

*Subdivision 2d.** From the mouth of Little Wills' creek to the Western end of the Eastern Section, below Cumberland.

Distance, 13⅞ miles—descent, 309 feet—39 locks.

From the Summit Level,	29 ms.	240 yds.	1325	166

At the commencement of this subdivision, the line of canal takes a sudden change of direction from nearly East and West to almost North and South. The valley also changes its character, becoming broader, more level, and less rapid in its descent.

The canal continues for 10½ miles on the right bank of the stream, passing alternately along steep and rocky hill sides, and through meadow land, but even in the latter requiring a large quantity of excavation of rock. It then passes over to the left bank, and continues for more than half a mile on favorable ground, when it enters the defile formed by the breaking of Wills' creek through the mountain of the same name.

The difficulties of this passage are great, and continue for more than a mile. The ground then becomes favorable, permitting the canal to pass at the outskirts of Cumberland, to join with the Eastern Section.

Provision is made for taking in a supply of water immediately below the junction of Great and Little Wills' creek, and also at several points below. Adjoining Cumberland, the canal will receive a feeder from the Potomac, for its supply below, and more especially to complete what is necessary in relation to the first subdivision of the Eastern Section.

This feeder is proposed to be made navigable,† in order to accommodate the trade of the Potomac above Cumberland: its length is one mile; its width, at the water line, 30 feet; its depth four feet. At its point of departure from the Potomac, a basin is formed in the bed of the river, by means of a dam erected at the first ledge above Cumberland. This basin, comprehending an extent of about eight miles, will afford a constant supply of water, and also accommodate the coal trade of the Potomac. The levees around the basin, the dam, the guard lock of the feeder, the feeder and its aqueduct over Wills' creek, are included in the estimate of this subdivision.

A basin is contemplated at Cumberland, and adapted to the probable wants of the place; it will be provided with locks to communicate with the Potomac.

The estimate of this subdivision amounts to $1,555 764 32.

The estimate of the Eastern portion amounts to $3,856,623 60.

WESTERN PORTION.

Subdivision 1st.‡ From the Western end of the Summit Level to the mouth of Middle Fork creek.

Distance, 16⅛ miles—descent, 216 feet—27 locks.

This subdivision commences at the Western end of the basin formed

* Sheet M, No. 6. † Sheet A, Survey of 1824. ‡ Sheet M, No. 4.

in the valley of Flaugherty's creek, and into which is introduced the feeder from the reservoirs in the valley of Casselman's. Having already stated all the details relating to this appendage of the Summit Level, we find ourselves dispensed from entering into further explanations upon the subject.

The canal, for this subdivision, is on the right bank of Casselman's river. On this distance, although no very formidable difficulties are presented, yet the amount of excavation of rock, as also the great quantity of walling, will render the work very expensive.

The six first miles are to be fed by the Summit Level, as it has been stated; as to the remainder, provision has been made, at several places, for taking from Casselman's river additional supplies.

It is to be observed, that this upper subdivision of Casselman's river has a descent less rapid than that of the lower: the reverse takes place in the valley of Wills' creek.

The estimate of this subdivision amounts to (the Western basin and deep cut excluded,) $1,240,215 32.

*Subdivision 2d.** From the mouth of Middle Fork creek to the mouth of Casselman's river.

	Distance, 19 miles 1030 yards—descent, 420 feet—53 locks.			
From the Western end of the Summit Level,	35	1250	636	80

This subdivision keeps on the right bank of Casselman's river, as far down as 440 yards below its mouth. The nature of the ground through which it passes resembles that of the subdivision above, except in the vicinity of the Youghagany, when it becomes much more favorable, offering more earth and less rock for excavation than above.

Occasional resorts to the stream will secure to the canal a competent supply of water. And, at the end of this subdivision, two feeders, one from Casselman's river, and the other from Laurel Hill run, are introduced for the supply of the section descending the valley of the Youghagany.

According to the documents hereto annexed, the estimate of this subdivision amounts to $1,459,316 93.

And the estimate of the Western portion amounts to $2,699,532 25.

We close the description of the present Middle Section by offering the following summary of the main facts relating to it:

	Distances.		Ascent and Descent.	Number of Locks.	Estimate.
	Miles.	Yds.	Feet.		Dollars.
Eastern Portion,	29	240	1325	166	3,856,623 60
Summit Level,	5	1280	-	-	3,471,967 01
Western Portion,	35	1250	636	80	2,699,532 25
	70	1010	1961	246	10,028,122 86

* Sheet M, No. 3.

WESTERN SECTION.*

This section commences 440 yards below the junction of Casselman's river with the Youghagany; it follows the right side of the valley to the Monongahala, and hence to Pittsburg, along the right bank of this stream.

The ground on the left of the Youghagany is nearly of the same kind as that on the right; the distance and descent the same for either bank; however, the right bank deserves the preference, on account of exposure, and of its receiving the main tributaries of the stream; it will not require, across the Youghagany, two aqueducts, which would otherwise become indispensable should the canal follow the left side of the valley.

This section will be supplied with water by the Youghagany and its tributaries; and since the Eastern end must rely chiefly upon the Youghagany, Casselman's river, and Laurel Hill run, we will first present the results of the gauging of the streams, made in 1825 and 1826, during the month of July:

		Cubic feet.
Casselman's, at its mouth, July 20th, 1825,	per second,	40
Laurel Hill run, at its mouth, July 20th, 1825,	- -	7
Youghagany river, above the mouth of the Casselman's, July 21st, 1825,	- - - - - - - -	70
	Cubic feet per second,	117

Casselman's, at its mouth, July 20th, 1826,	per second,	46
Laurel Hill run, do	- - - - -	26
Youghagany river, above the mouth of Casselman's, July 20th, 1826,	- - - - - - - -	104
	Cubic feet per second,	176

These results, though obtained at a time of low water, yet cannot be deemed as the minima of what these streams can afford: when measured, they were not at their lowest stage. Therefore, we assume but 70 cubic feet per second, as the minimum of water yielded by these three streams taken together, at the driest epoch of the year.

The Youghagany, gauged at other points, has given, in 1825, the following results:

		Cub. ft.		Cub. ft.
July 28th, at the Ohiopile Falls,	per second.	155	reduced to	100
August 2d, at Connelsville,	- - -	129	do	100
September 2d, at its mouth,	- - -	200	do	150

The stream, though very low when measured, was not, however, at its lowest stage; but the season was uncommonly dry, and the above reductions may be considered as minima.

* Sheet S, No. 6

To these resources of running water, we must add the following reservoirs :

	Cubic Yards.
Indian creek,	210,370
Mountz creek,	323,889
Jacob's creek,	356,857
Big Sewickly creek,	1,750,180
Dunbar,	214,464
	2,855,760

To which may be added the reservoirs which might be formed in Casselman's river and Laurel Hill run valleys.

We must remark, that the feeders from all these reservoirs will be very short, their length varying from half a mile to four miles only.

Having pointed out the means upon which we have full reliance to feed this section of canal, we shall show their distribution at the same time as we describe the successive subdivisions of said sections.

*Subdivision 1st.** From the Western end of the Middle Section to Connelsville.

Distance, 27½ miles—descent, 432 feet—54 locks.

This subdivision begins about one-quarter of a mile below the mouth of Casselman's river. The bottom of the canal is placed here four feet above the level of low water in Casselman's river, in order to afford the greatest advantage in taking a feeder from this stream, and also in using the most favorable ground below.

In the course of the first three miles, the ground becomes gradually more difficult, until it assumes the rocky and steep appearance which is so peculiarly the character of the Youghagany in so many parts of its upper course. To this difficulty of the ground, must be added those arising from the necessity of keeping the canal above the freshets, whose elevation varies from 13 to 16 feet.

The ground continues unfavorable as far down as the Old Salt Works, seven miles from the beginning of this subdivision, where the line pursues, for a short distance, some favorable ground. But it becomes, almost immediately, thrown upon a steep hill side, covered with loose rocks, and which continues for three miles further, to Ohiopile Falls.

These Falls form one of the most remarkable features of the Youghagany, and are formed by the river breaking through the rocky base of the ridge of Laurel Hill. The difficulty it has found in forcing this obstacle, is plainly indicated by the sudden bend which the river here makes, and the rough appearance of the channel it has carved out. It is most fortunate that the line of canal can, by means of a moderate cut, 283 yards long and 18½ feet deep, avoid pursuing the bank of this rugged channel. This deep cut across the neck of the bend of the river, has, besides, the advantage of shortening the line by one mile and a half.

* Sheets S, Nos. 2, 9.

A feeder is proposed to be taken from the river a little above the Falls, for which the localities are very favorable; but the line of canal, by pursuing the most advantageous ground, has to descend, within the short distance of one mile, 96 feet; which circumstance will oblige to locate the locks too near to each other for presenting ponds of sufficient extent between them. Several plans suggested themselves to obviate this inconvenience. First, to have the intervening ponds sufficiently wide to admit the easy passage of two boats at once; and to supply these ponds and the locks by means of a waste weir parallel to their course. Second, to have lateral reservoirs to receive the contents of adjoining locks, and to transmit it respectively to the second lock below. Third, to make the ponds liable to have the level of their waters varied from two to three feet, and thus making them perform the functions of locks. A close examination, when locating the line, will determine which of these means deserves the preference. The two first will cause a greater consumption of water than usual; but as a feeder is to be immediately introduced above, for the purpose of supplying the next level below, this consumption is not, in this case, to be taken into consideration.

Below the Ohiopile Falls, the ground continues difficult, for about 9 miles, to Indian creek. On this distance, the canal is, mostly, to be carried along a steep bank, in part supported by walls, and excavated through rock. The descent is also rapid, being about 160 feet, and requiring 20 locks.

Indian creek is to be crossed by an aqueduct; it will afford a valuable supply of water, for securing which a feeder and reservoir are proposed.

The ground from Indian creek to Connelsville, 7 miles, is still difficult, but more varied in its character than above: it will necessitate, alternately, steep hill side cutting, much of which is rock, and some expensive walling, interspersed with some pieces of moderate cutting.

A basin is proposed at Connelsville, on the level of the canal, for the accommodation of the trade of this place; its communication with the river is established by means of locks.

This subdivision is supplied with water by the Youghagany above the mouth of Casselman's river, by Casselman's river and Laurel-Hill run: at the Ohiopile Falls it receives a new supply from the Youghagany; at Indian creek it will also, when necessary, receive a supply from the reservoir formed above the mouth of this creek.

From the detailed estimate, hereto annexed, the estimated cost of this subdivision amounts to $1,515,436 59.

*Subdivision 2d.** From Connelsville to Sewickly creek.

	Distance, 27¼ miles—	descent, 144 feet—	18 locks.
From the beginning of the Section,	54¾	576	72

* Sheets S, Nos. 3, 9, 10.

Before arriving at Connelsville, the line may be said to have completely passed the range of the Western ridges, and the face of the country undergoes an entire change. The banks of the river, however, do not so suddenly lose the character they bear above, but it continues to offer a succession of similar, though gradually decreasing difficulties, for some distance below. This subdivision will, therefore, like the portion above Connelsville, require, for almost its whole distance, steep side cutting and walling alternately; it will, consequently, be expensive.

Mountz's creek, one mile, and Jacob's creek, 17 miles, below Connelsville, will afford a valuable supply of water for this subdivision; but a resort to the river is still considered necessary, and provision is made to effect this a little below Mountz's creek.

The two creeks here above mentioned are to be crossed by aqueducts, which, owing to the great breadth of the valleys, will require, at their ends, considerable embankments.

The estimated cost of this subdivision amounts to $1,306,425 95.

*Subdivision 3d.** From Sewickly creek to the mouth of the Youghagany.

	Distance, 16½ miles—descent, 8 feet—1 lock.		
From the beginning of the Section,	71¼	584	73

This subdivision offers a larger portion of easy cutting than the preceding, but will still require a large portion of side cutting, and walls to pass round the bluffs. These subdivisions are numerous, and though none individually is of great extent, yet they form, together, a length of several miles of expensive works.

As McKeesport is at the junction of the Youghagany and Monongahala, a basin is proposed there for the accommodation of the trade of the latter stream.

The only lateral supply of water for this subdivision, is from the reservoir above the mouth of Sewickly creek, and it becomes necessary to resort to the Youghagany again, in order to meet the deficiency which otherwise would be felt on the subdivision to Pittsburg. To fulfil this object, a dam is proposed across the Youghagany, at a favorable point, three miles above its mouth. This dam will require a considerable height, and therefore locks must adjoin it, that the navigation of the stream should not be injured by the works of the canal, but rather be benefitted by them.

The estimate of this subdivision amounts to $741,469 64.

*Subdivision 4th.** From the mouth of the Youghagany to Pittsburg.

	Distance, 14 miles—descent, 35 feet—5 locks.		
From the beginning of the Section,	85¼	619	78

* Sheets S, Nos. 4, 10.

This subdivision is generally located through favorable ground; however, some side excavation will still be necessary, and a deep cut, near Pittsburg, of about three miles in length and 15 feet of average depth, is indispensable to avoid a line yet more difficult and expensive.

This subdivision is almost entirely dependent on the Youghagany, above McKeesport, for its supply of water: the streams crossed by the canal afford so little water during the dry season, that no reliance can be placed upon them.

According to the documents hereto annexed, the estimate of this subdivision amounts to $606,891 60.

Summary of the Western Section.

Distance.		Descent.	Number of Locks.	Estimate.
Miles.	Yds.	Feet.		Dollars.
85	440	619	78	4,170,223 78

Here ends the description of the several Sections of the Chesapeake and Ohio Canal, and whose General Summary is as follows:

	Distance.		Ascent & Descent.	Number of Locks.	Amount of the Estimate.
	Miles.	Yds.	Feet.		Dollars.
Eastern Section,	186	00	578	74	8,177,081 05
Middle Section,	70	1010	1961	246	10,028,122 86
Western Section,	85	440	619	78	4,170,223 78
	341	1450	3158	398	22,375,427 69

The foregoing description shows that the Chesapeake and Ohio Canal presents nearly all the characteristics which contribute to render a work of this kind very expensive, viz: an extraordinary amount of lockage; a long tunnel, passing under a very elevated ridge; walling unusually frequent along the whole line: extensive portions of deep cutting; excavation of rocky ground, and side cutting, predominating from one end of the canal to the other. The tunnel and lockage alone, form, together, the four-elevenths of the whole expense; and if, from the total estimate, we take out the tunnel, and reduce the lockage to 1200 feet, (which may be deemed an usual amount for such a distance,) the estimate would then amount to about sixteen millions of dollars only, notwithstanding the other difficulties to be overcome, and the accommodation of trade along the valleys of the Potomac and Youghagany.

We will also observe, that the Middle Section alone, whose length is but 70 miles, or one-fifth of the whole length of the line, will cost (according to the estimate) 10 millions of dollars, or the five-elevenths of the whole expense; whilst the Eastern and Western Sections, whose lengths form together the four-fifths of the whole, will cost but 12 millions of dollars, or the six-elevenths of the whole estimate.

We consider, however, as fortunate, that these two expensive articles, extra lockage and tunnel, should be found both located upon a section which, after new investigations, and mature reflections, might prove to be advantageously superseded by a rail way. Indeed, the inexhaustible mines of coal found in the lower parts of the valleys of Wills' creek and Casselman's river, seem to point out to us, as a means to avoid this expensive Middle Section, the expediency of a rail-way, with either locomotive engines, or stationary steam engines used as lifting power.

We must also observe, that this section will be wanted but after the completion of the Eastern and Western Sections; which two last, bringing Washington and Pittsburg within 70 miles of land communication, would soon point out, by their results, what should be the most expedient mode of connecting them. Perhaps, then, a smooth road, with an easy graduation, would, at first, be resorted to from the mouth of Casselman's river to Cumberland; or, should a great amount of trade warrant it, a rail-way might be adopted. In this latter case, which we deem the most probable, the revenue of the Eastern and Western Sections would not only afford the usual interest of the capital employed in their construction, but also have a surplus fund with which a rail-way might be erected.

Therefore, we are decidedly of opinion, that, for the present, the expense relating to the Eastern and Western Sections ought, exclusively, to be taken into consideration; that the sum of about twelve millions of dollars, to be expended for their construction, will create the means and afford the resources to procure to the work the mode of completion most adequate to its object.

Our instructions being to plan a canal from tide water in the Potomac to the head of steam-boat navigation in the Ohio river, we had not to take into consideration either rail-ways or any other substitute for the difficult and expensive sections of the canal; therefore, no operations in the field, no investigations in the closet, have been made in relation to such an alternative. And, indeed, had even our instructions demanded such inquiries, the want of time and the limited means at our disposal would have prevented us from bestowing upon the subject the full and mature consideration to which it is so deservedly entitled. However, we do not hesitate anticipating that a rail-way from the mouth of Casselman's river to Cumberland, will bear, as to expense and time, a favorable comparison with the Middle Section above described.

We recommend, therefore, for a canal from tide water, in the Potomac, to the head of steam-boat navigation in the Ohio, the route and plan here above described; and we submit, respectfully, to considera-

tion, the expediency of making the surveys and investigations necessary to ascertain, as accurately as practicable, the comparative merits of a rail-way and a canal for the section of route from Cumberland to the mouth of Casselman's river.

Before closing this part of the report, we must mention the officers to whom have been entrusted the arduous and responsible task of performing the surveys and levellings upon which the foregoing plan has been predicated.

The surveys and levellings of the banks of the Potomac, from the mouth of Savage down to tide water, have been executed by Lieut. Col. J. J. Abert, Topographical Engineer, assisted by William H. Swift, Lieutenant Artillery, J Vail, Lieutenant Infantry, J. Macomb, Lieutenant Infantry, J. K. Findlay, Lieutenant Artillery, N. B. Bennet, Lieutenant Artillery, H. A. Wilson, Lieutenant Artillery. These gentlemen have suffered much in consequence of the usual sickness of the valley of the Potomac during the warm season; and it is owing to their perseverance and activity that the preparatory surveys were completed in due time. All the streams emptying into the Potomac have been gauged by this surveying brigade. The memoir of Lieut. Col. Abert, and all his maps and profiles, are annexed to this report.

The surveys, levellings, and gauging of water, relating to the Eastern portion of the middle section, by Deep creek, as also to the middle section, from Cumberland to the mouth of Casselman's river, have been performed by Captain Wm. G. M'Neill, Topographical Engineer, assisted by Captain De Russy, Artillery, Wm. Cook, Lieutenant Artillery, R. E. Hazzard, Lieutenant Artillery, J. N. Dellabunty, Lieutenant Artillery, J. M. Fessenden, Lieutenant Artillery, and W. G. Williams, Lieutenant Infantry. As already stated above, Captain M'Neill has, also, been intrusted by the Board with the investigations relating to the tunnel at Flaugherty's.

The memoirs of Captain M'Neill, and his maps and profiles, accompany the present report: they do the greatest credit to Captain M'Neill and his assistants.

The Western portion of the middle section by Deep creek; the whole line of canal through the valley of the Youghagany, from Deep creek to Pittsburgh; the experimental line through Briery mountain, have been surveyed, levelled, and investigated, by the late James Shriver, Esq. assisted by Messrs. J. Williams, Asa Moore, and Joseph Shriver.

The memoir, maps, and profiles, referring to the field operations, and various investigations made by this surveying brigade, are annexed to the present report: whilst they will confer honor upon the memory of the deceased, they will reflect due credit upon his able assistants. Very early, J. Shriver had been extremely zealous and sanguine as to the national work forming the subject of this report: his exertions have been great and valuable during the preliminary investigations, and his talents would have been highly useful during the execution of the work. But, when in the State of Indiana, and performing duties connected with improvement through this State, James

Shriver fell a victim to the sickness prevailing during the month: thos our Department has lost a very efficient officer; the community a very useful citizen.

Lieutenant Wm. G. Williams, and Lieutenant Wm. B. Thompson, of the infantry, have been employed for some months in the office of the Board, where they have rendered useful services.

Lieutenant Jefferson Vail, infantry, has been also employed with the Board: his industry and assiduity have been of great service.

We are indebted to Colonel I. Roberdeau for the zeal with which he has assisted us in furnishing valuable information afforded by the Topographical Bureau under his charge.

Lieutenant John Farley, artillery, has drawn, from the manuscript maps and profiles, on a large scale, accompanying this report, the reduced map and profile whose engraving is hereto annexed.

Before closing this report, we beg leave to submit some general considerations upon the national importance of this work, with a view to compare the expense of its erection, with the benefits to be derived from it.

GENERAL CONSIDERATIONS.

The public works of the moderns differ essentially in their construction from those erected by the ancients: these bestowed much magnificence and grandeur on their edifices. In those times, large and unemployed populations, large masses reduced to servitude, by war or conquest, afforded, then, such powerful means of execution, that economy was not an essential point to be consulted: for, to wage war and to erect public works, appears to have been the chief occupations of the ancient nations, among whom civilization had attained a considerable degree of improvement.

The situation of the moderns is different: with them, the subdivision of labor among the different branches of industry, the abolition of slavery, or the progressive amelioration of the state of servitude where it does exist, in restoring to man his dignity and his liberty of action, have attached to his labor a value which is identified with his moral and physical existence. Economy has, therefore, become an essential object in the erection of monuments consecrated to the public prosperity, and besides the conditions of durability and expedience, it is also required that the efforts made should be in due proportion with the useful results obtained. These conditions being fulfilled, such monuments justly become the objects of national pride; and, combined with the civil and political institutions, literature, and naval and military achievements, form a union of glory about which the sympathies of the country are rallied, are strengthened, and are continued. Thus we perceive all the enlightened Governments of the present time to favor such undertakings; they well know that, in the age of illumination and of rapid amelioration in which we are placed, all that contributes to the national glory, and promises certain and material

advantages, should receive a prompt and judicious execution. For the Union, such is the Chesapeake and Ohio Canal.

This great undertaking has no equal, in any country, either in relation to the works of every kind which its construction will require, or to the immense political, commercial, and military advantages which will result from its execution. It is a work truly national; and if, on the one hand, it is beyond the means, always limited, of private enterprise, so, on the other, it is too essential to the prosperity, the harmony, and the greatness of the Union, for its execution to be deferred, without neglecting advantages which will far exceed the expense into which it will necessarily lead. It is not, in fact, because a work demands a large sum for its execution, that it is costly, but only when the capital employed to create it is beyond all proportion to the useful results to be obtained. It is, therefore, the relation between this capital, and these results, which is to be taken into consideration. The extent of the first, however great, becomes entirely indifferent, when, on the other hand, the resources of the nation are equal to its attainment.

Considered under this point of view, the Chesapeake and Ohio Canal, notwithstanding the great first cost which it will require to receive such an execution as is suitable to its object, may, with full and entire confidence, be considered as not expensive, in relation to the immense advantages, of every kind, which it offers. This position we will now attempt to demonstrate, beginning by its physical advantages: that is to say, those susceptible of being estimated by the standard of money.

When a nation undertakes a work of great public utility, such as that under consideration, the revenue is not the essential object for it to take into consideration: its views are of a more elevated order: they are all, and, it may be said, exclusively, directed towards the great and general interests of the community. These interests are principally to bring into contact and relation, districts which are naturally separated, either by great distance, or by physical obstacles; to connect countries deprived of natural outlets, with those where these exist; to create for the products of the soil and of industry, a value which they do not possess, from the want of a market, and from the too heavy expense of transportation; to increase, progressively, the quantity of these products, by the facility of exchanging them with distant countries; to encourage, by these means, and enliven agriculture; to support and increase manufacturing establishments; to vary the class of producers, and bring it near to the class of consumers; in fine, to augment both production and consumption, by the facility of transporting products from sections where they abound to those where they are deficient.

When these national interests are satisfied, the principal object for which the work is undertaken is accomplished; and the final advantage derived from the canal, and which would be an essential point to a company, becomes, in this case, of merely secondary importance for the nation. We will therefore, in the first instance, endeavor to esti-

mate the physical and national advantages which it appears to us must result immediately from the accomplishment of the great work before us; and next, we will take into consideration the secondary object, that is to say, the probable revenue of the canal.

Before submitting our computations on this head, we should premise, that we will steadily follow the plan we have adopted in the former part of this report, namely, to avoid as much as in our power falling into any exaggeration in favor of the work, and to take the greatest care to remain below even the most probable chances. Nevertheless, if it be found that we have sometimes failed in this, the fault is to be attributed to an error of judgment on our part, and not to any want of candor in our intentions.

The districts the more particularly interested in the construction of the Chesapeake and Ohio Canal, may be divided into two classes: 1st, The counties situated immediately adjacent to the line of canal; 2d, The Western States to which this communication will prove a favorable outlet to the Atlantic.

Among the first are:

	Inhabitants.
Nine counties of Pennsylvania, whose population, according to the census of 1820, amounted to - - -	256,782
A population amounting to something more than one-fourth of that of the State.	
Four counties of Maryland, - - - -	92,000
Composing something less than one-fourth of the population of the State.	
Thirteen counties of Virginia, population amounting to -	189,585
Something less than one-fifth of that of the State.	
Total of these 26 counties,	538,367
This total is something more than one-fifth of the whole population of the three States.	
The District of Columbia, - - - -	33,039
Total,	571,406

Among the Western States to which the canal would afford a direct outlet to the Atlantic, we will only take Kentucky, Ohio, and Indiana, whose respective population is as follows, according to the census of 1820:

	Inhabitants.
Kentucky, - - - - - -	564,317
Ohio, - - - - - -	581,434
Indiana, - - - - -	147,178
Total,	1,292,929
Which added to	571,406
Gives	1,864,335

Forming nearly one-fifth of the population of the Union.

This population is the least that we can consider as directly interested in this undertaking. We will not take into account either the other counties of Pennsylvania, Maryland, and Virginia, which will indirectly derive advantage from the canal, nor the State of Illinois, nor the Michigan Territory.

The 26 above counties form together an extent of territory of about 15 millions of acres, of which the greater part presents a rich limestone soil, while the less productive remainder is covered with excellent timber, and contains inexhaustible mines of coal and of iron. We estimate the mean value of the acre at four dollars, which, for fifteen millions, gives a total value of $60.000.000.

Now, if we take into consideration the actual state of depreciation of these lands, owing in part to the difficulty of transporting their products to an advantageous market, we cannot doubt but that the canal, in removing this obstacle, will give immediately to these lands an increase of value, a necessary result of the increase of value of the products. We will suppose it to be 20 per cent. which will give, for the 26 counties, $12,000,000.

The three States abovementioned, offer an extent of 72,000,000 acres, of which the fertility is so great, that it will perhaps support, at a future day, a denser population than any other part of the Union. A recent assessment fixes $2 49 per acre as the mean value of land in the State of Ohio. We will take $2 for that of the three States, which gives for the mean value of 72,000,000 of acres of their territory, $144,000,000.

As soon as the canal shall be in operation, every part of these States finding another economic outlet to the Ocean, not only will the exportation of their products be facilitated in a high degree, but these will also receive an increase of value resulting from the creation of a new market, which will obviate to the seller the inconvenience of glutting that of New Orleans, and thus placing him at the mercy of the purchaser. These products, although the same in quantity, will therefore acquire an augmentation of value, in which the lands must necessarily participate. We will suppose this increase of territorial value to be 12 per cent. which gives $17,280,000.

In this increase of territorial value, we should include the District of Columbia, which, being at the termination of this important channel of trade, will be peculiarly favored. This District is at present assessed at only $15.000 000, which shows how much its property is depreciated. Combining this depreciation with the great advantages to result from its being the outlet of the canal, we adopt here fifty per cent. for the probable increase of its property, which will give 7,500.000.

The summary of the augmentation of value of landed property, or the gain made by the owners of real estate, in consequence of the opening of the canal, will therefore be—

For the counties adjacent to the line of canal, - -	$12,000.000
For the States directly favored by the canal, - -	17,280,000
For the District of Columbia, - - - -	7,500,000
	$36,780,000

Conclusion. At the moment of opening the navigation of the canal the proprietors of real property will gain together a value equal to one and a half times the whole expense of the construction of the canal, (which is $22,000,000,) and equal to three times the expense of construction of only the Eastern and Western Sections together (which is 12,000,000.)

We should here remark, that the Union owns, in the States of Ohio, Indiana, and Illinois, and the Michigan Territory, 59,998,000 acres of land, besides 18,946,000 acres not yet ceded; valuing the first at $2, we have $119,996,000; and, supposing only ten per cent. for the augmentation of value they will receive, we find the Union, as landholder, will gain about $12,000,000 by the opening of the canal; to which should be added the land owned by the Government in the District of Columbia.

Let us now consider what will be the advantages obtained by the increase of products created, and brought into value by the opening of the canal.

It is proper to remark, that the canal, before being entirely completed from Georgetown to Pittsburg, will still give successive results from the very commencement of its construction: for, while the work will advance, on the one side from Pittsburg, and on the other from Georgetown, the distance of transportation by land between these two places will diminish annually; and, particularly on the Eastern Section, each portion, when finished, from one tributary of the Potomac to the other, will place the valley of this tributary in communication with the Ocean. Thus each portion, as soon as built, will successively produce a partial result, and will afford advantages which will indemnify, if not entirely, at least in part, the expenses incurred from year to year: although it will only be when the whole line shall be completed, that the canal, being brought into full operation, will produce the complete results for which it is destined. It is only for this period that the following calculations are made.

The articles exported, at the present time, by the districts under consideration, may be divided into two classes: 1st, Those produced by agricultural and manufacturing industry; 2d, Those which are in some measure immediately afforded by the soil itself.

The first class consists of *wheat, corn, flour and meal, rye, tobacco, hemp, flax, flaxseed, beef, pork, bacon, lard, tallow, whiskey, iron, glass, &c.*

The second class consists of *coal, lime, timber, plank, boards, slate, marble, freestone, &c.*

The annual amount of exportation of the articles of the first class has been differently estimated at different periods: 275,000 tons have been considered as a minimum, and 390,000 as a maximum. We will adopt 350,000 tons, which, at the moderate valuation of sixty dollars per ton, gives $21,000,000.

These exportations together comprise those made to New Orleans, and those made to the Atlantic by the Potomac and land communications. It is certain that the facility of transport offered by the canal

will increase the amount of these exportations, that is to say, will cause an increase of production. In fact, if the Mississippi is the outlet of the States above enumerated, to the Gulf of Mexico, the Chesapeake and Ohio Canal will become their outlet to the Chesapeake. These States, thus having two water communications for the exportation of their products, these last must annually increase in quantity, and we should say in value also, as they will then have the choice of the most advantageous market. What will be the annual augmentation of these products? Conjecture is all that we can here offer; and, in assuming it at five per cent. we believe that we are far within the truth.

This being established, and $21,000,000 being the value of products at the present time, if we examine what it will be at the time of the canal's going into operation, (and it will certainly increase with the population during the construction of the canal,) we find, by calculation, that, at the rate of 5 per cent. per annum, the sum of the successive augmentations during the six first years, will be $23,977,170, the augmentation of the sixth year alone being $7,141,005.

This sum of $23,977,170, representing the sum of the increase of products for six years, is a creation which belongs entirely to the canal, and which, without it, would not exist: it is about two millions above the expense of construction of the whole canal, and nearly the double of the expense of construction of the Eastern and Western Sections together.

As regards the products of the second class, such as *coal, lime, timber, &c.* their great weight, and the want of economical communications to bring them into market on such terms that they may compete in price, combine together to render their present value, so to express it, null. Their exportation, and consequently their value, will be another creation of the canal, a creation which must be considered the more important, when we reflect on the powerful influence exerted over manufacturing industry by a single one of these articles, namely, *coal.* It is difficult to calculate, in anticipation, what will be the annual consumption of this material, the inexhaustible source of public riches and of private economy; but, if we consider that the counties on the Potomac, the District of Columbia, the population of Baltimore, and the iron works in its vicinity, will extensively use it, we do not think that during the first years its annual consumption will be less than 150,000 tons. In fact, the population alone of these counties, and of the District, amounts to 314,624 inhabitants, and our supposition only allows half a ton for each inhabitant, while the proportion admitted for large cities, which make an extensive use of this fuel, is one and three-fourths of a ton for each inhabitant.

Now, estimating the ton at seven dollars, the 150,000 tons give 1,050,000 dollars for one year, and six years $6,300,000.

As to the article of lime, the mere fact that, at Washington City, for want of economical communications, the lime used is brought from Rhode Island, shows that this article will acquire from the canal a value of which it is entirely deprived at the present time, as an object of exportation.

The same observation will apply to the timber, of all kinds, which the valleys of the Potomac, and of the Youghagany, and the ridges which they traverse, offer in abundance.

We will suppose, merely from conjecture, that the articles composing the second class alone, exclusive of coal, will receive a value created by the canal equal to 120,000 dollars per year, or for six years $720,000.

In summing up the augmentation of products of the articles thus enumerated, we have—

For the articles of the first class,	- - - -	$23,977,170
For those of the second class,	Coal, - - -	6,300,000
	Lime, timber, &c. -	720,000
	Total, for six years,	$30,997,170

But this creation of products, of which the transportation and exportation will take place from West to East, will cause in itself an increase of return trade, which would not exist if the canal itself did not exist. This trade may be divided into two classes of merchandise: the one composed of domestic manufactures, the other of foreign manufactures. The proportion between the amount of these two classes can only be fixed in a conjectural manner, and we will adopt here, for the former, the third, and for the latter, the two-thirds, of the value of the exportation (from West to East) of the articles of the first class only. Thus the third, of $23,977,170, or $7,992,390, will form another source of domestic wealth created by the canal, and in which our fisheries would form an important item. This sum, added to that of $30,997,170, gives $38,989,560.

Conclusion. Six years after the canal shall have been in operation, the augmentation of the products created by the canal, or which amounts to the same, the advantages obtained by the producers, presents a value equal to one and three-fourths times the whole expense of construction, and more than three times the expense of the Eastern and Western Sections taken together.

If the public Treasury will derive certain advantage by the influence which the canal will have on the augmentation of the value of the lands belonging to the Union, it will also receive others, full as certain, by the increase of products exported abroad.

We have just estimated these at two-thirds of the total quantity of the products of the first class created by the canal; that is to say, the two-thirds of $23,977,170, or for the six years which will follow the opening of the navigation at $15,984,780.

But the duty received on imports being valued at 25 per cent. of domestic products exported, it follows that the Treasury will receive $3,996,195, during the six years following the completion of the canal; an amount entirely due to this work, and belonging to its creation.

Conclusion. Adding the preceding sum to that of twelve millions presented above, as the increase of the value of land, it follows, from these computations, that the Union is interested for about sixteen mil-

lions in the accomplishment of the Chesapeake and Ohio Canal—a sum which is more than the two-thirds of the total expense of construction of this work, and one and one-third times the expense of the Eastern and Western Sections taken together.

It is proper here to observe, that, if the revenue of the Union, arising in time of peace almost exclusively from the customs, is sufficient to meet the expenses of Government, it will probably become inadequate to this object in time of war, when it will become indispensable to have recourse to internal taxes. The Union will, therefore, find in the improvements due to the existence of the canal, important resources, the value of which is not included in the present computation.

Another item in favor of the Union, which has also been omitted in this computation, is the increase of the number of sailors which must naturally result from the increase of the amount of exports, and thus extend the nursery of the defenders of its flag. These exportations amounting, as shown above, to $15,984,780, which, at the rate of sixty dollars per ton, (price adopted in these computations,) would make 266,413 tons during the six years following the opening of the canal; the sixth year would give, by this valuation, 79,344 tons, which, on the supposition of two voyages being made in a year, would cause an increase of shipping of about 50,000 tons, and of 2,000 sailors, supposing, as a mean, 4 sailors required for each 100 tons.

To all the benefits which have just been enumerated, we should add those arising to commerce and to the carrying business: we will suppose them together to be six per cent. on the total value of the articles of the first and second class, of which the amount is $30,997,170; this item will thus be, for six years, $1,859,830.

Limiting to the above objects our estimates of the physical and national advantages which, at the end of six years, will be owing to the Chesapeake and Ohio Canal, we will here present the summary of the same:

Augmentation in the value of lands, or benefit derived by the owners of real property, . . .	$36,780,000
Total of successive augmentations of the value of the products during six years, or advantages obtained by the producers, ...	38,989,560
Total of successive augmentations by the revenue of the customs, during the same period, . . .	3,996,195
Benefits derived to commerce and the carrying business together, and for six years, . . .	1,859,830
	$81,625,585

Conclusion. Thus, supposing even that the augmentation of the value of land, at the rate at which we have reckoned it, should not be completely realized until six years after the opening of the canal, the general benefits of public and private economy will amount together to more than 81 millions of dollars. This sum is equal to three and three-fourths times the whole expense of the construction of the canal.

and to six and two-thirds times the expense of the Eastern and Western Sections taken together. Consequently, in a national point of view, even should the Chesapeake and Ohio Canal afford no revenue in itself, and its tolls be so regulated as to pay only the annual expense of repairs and superintendence, the physical advantages which would result from its accomplishment would far exceed the expense in which it would have involved; in fact, a few years only would be sufficient to produce an equivalent to the capital employed in the erection of the work. If we add to all these considerations, the spirit of enterprise, which is the characteristic of the population of our country; the rapid increase of this population; the fertility of the districts more peculiarly interested in this great work, and the variety of their productions, the most cool and sceptical mind will be obliged to confess, that the future will undoubtedly present results far beyond those which these calculations can offer by anticipation.

As regards the probable revenue, strictly so called, of the canal, although it be not, in the present case, an essential point, nevertheless, in fixing the rate of tolls at an even moderate scale, they will be sufficient, from the first years, to afford a reasonable interest for the capital employed in the construction of the work; an interest which will thereafter progressively increase with the population and the developments of industry produced by the existence of such an outlet to the ocean. We should also remark, that, even before the completion of the work, each portion, as successively finished, will immediately produce a revenue which will afford, if not an entire, at least a partial interest, for the capital employed in the construction of such respective portions; but it will be only after the entire completion of the work, and its going into active operation, that we may hope to derive an interest which will bear an advantageous relation to the capital. It is, therefore, only for this period that the following calculations are made.

We have seen above, that, at the present time, 350,000 tons have been considered as a mean estimate of exports made, both to New Orleans and to the Atlantic ports, from the districts peculiarly interested in the Chesapeake and Ohio Canal. We will suppose that the third only of this amount, or 116,666 tons, will take the course of the canal, which, for six years, will give - - tons, 699,996

The increase of products of the first class, reckoned above at $23,977,170 for six years, represent at the rate of 60 dollars per ton, - - - - -	399,619
Coal, at the rate of 150,000 tons per year, and for 6 years,	900,000
Lime, timber, boards, &c. for six years, - -	24,000
Total per 6 years for the trade from West to East, tons,	2,023,615
To this should be added the tonnage of the return trade; on the Erie canal it is estimated at one-fifth of the descending trade; we will here suppose it to be one-tenth,	202,361
Total of the tonnage of the trade, in both directions, during the six first years, - - - tons,	2,225,976

Which, at the mean rate of 1½ cents per ton per mile, and for a mean distance of 200 miles, would give, for the tolls of the six first years together, - - -	$6,677,928
To which must be added the tolls on the boats returning empty, and of which the tonnage amounts to 1,821,254 tons, which, at the rate of one-tenth of a cent per mile, and for 200 miles, will give - - -	364,250
Total of tolls during the six first years taken together,	$7,042,178
Which makes, for a mean year, - -	1,173,696

A revenue which is 5 per cent. of the total expense of construction of the canal, but which must be reduced to 3½ per cent. as 1½ per cent. must be deducted for the repair and superintendence of the work. This same revenue is 10 per cent. of the expense of construction of the Eastern and Western Section together, or 8½ per cent. after deducting 1½ per cent. for repair and superintendence.

We should here notice, that this low rate adopted for repair and superintendence, can only be admitted on the supposition of the canal being, in the first instance, solidly built; if it were otherwise, the expense of repairs would be considerable, and would consume the greatest part of the revenue, on account of the peculiar exposure to violent causes of accident to which this work is liable.

But having taken a mean year of revenue among the six first years, let us examine what the revenue will be for the seventh year.

We have, for the present trade towards the Atlantic, either by the Potomac, or by the great roads, per year, as above, - - - - - - tons,	116,666
For the increase of products belonging to the seventh year, for $8,548,055, at the rate of one ton for $60,	142,467
Coal for one year, - - - -	150,000
Lime, timber, boards, &c. for one year, - -	4,000
	413,133
One-tenth for the return trade, - - -	41,313
Total,	454,446
These 454,446 tons, at the rate of 1½ cents per ton per mile, and for a mean distance of 200 miles, will produce a revenue of	$1,363,338
For the boats returning empty, and whose tonnage will amount to 371,820 tons, at the rate of one-tenth per mile per ton for 200 miles, gives - - -	74,364
Total of tolls for the seventh year, - - -	$1,437,702

This revenue of the seventh year is 6½ per cent. of the whole expense of construction of the entire canal, and 5 per cent. after deducting 1½ per cent. for the expense of repairs and superintendence.

The same revenue is 12 per cent. of the expense of the Eastern and Western Sections taken together, and 10½ per cent. after deducting 1½ per cent. for repairs and superintendence.

Let us now examine what will be the revenue for the maximum of trade of which the canal is susceptible.

We have seen, in that part of this report which relates to the Middle Section, that 28,000 boats should be considered (regard being had to the supplies of water and to the loss of time ensuing from the passage through the tunnel) as the maximum of commerce from West to East, and from East to West, taken together. 14,400 loaded boats will pass from the West; and 14,400 will pass from the East, which, from the supposition above made, will be only one-tenth loaded. There will, therefore, pass by the summit level, in a year, that is, during the eight months of navigation, 15,840 loaded boats and 12,960 return boats not loaded. The boat which we adopt to navigate this canal will displace about 90 tons weight of water, drawing three feet of water, and will carry a burden of 60 tons.

The 15,840 loaded boats will consequently carry 950,400 tons; and, as the question here refers to the maximum of trade passing by the summit level, we must admit that these boats will navigate the entire line of the canal, and that they will pay toll for 342 miles, which, at the rate of 1½ cent per mile, will give	$4,875,552
The 12,960 empty boats, representing 777,600 tons, will make the same passage as above, but will pay only one-tenth of a cent per ton per mile, which will give -	265,939
As to the trade of the Eastern Section alone, in supposing it to be only 300,000 tons in both directions, namely, 120,000 tons for the articles of the first and second classes, coal excepted, and 150,000 tons for coal, total 270,000 tons: to which adding one-tenth for the return trade, gives 197,000 tons, or, in round numbers, 300,000 tons: it will therefore produce, at 1½ cent per ton per mile, and for a mean distance of 90 miles, - -	405,000
For the nine-tenths of 300,000 tons, or 270,000 tons for the boats returning empty, at the rate of one-tenth of a cent per ton per mile, and for 90 miles mean distance,	24,300
Total of the annual revenue of the canal, when its trade, by the increase of population, and the action of the canal itself, combined, shall have reached its maximum,	$5,570,791

Thus, at this period, four years of revenue of the canal will cover the whole expense of its construction.

As to what regards the total value of the maximum of trade which can be borne on the canal, we can offer nothing more than conjectures, and in such case the field is vast: therefore, we are far from pretending to offer here any result which can be considered as within reasonable limits of exactness. We have, therefore, but some views of a very general nature to submit on this point.

The maximum of annual trade, from West to East, according to the calculations above, will consist—

1st, Of 14,400 boats, carrying each 60 tons, and together,	tons, 864,000
2d, Of 120,000 tons for the Eastern Section, of the products of the first and second class, coal excepted, -	120,000
	Total, tons, 984,000
Which, at the rate of sixty dollars per ton, price adopted in the preceding calculations, will give - - -	$59,040,000
3d, 150,000 tons of coal, at the rate of 7 dollars each,	1,050,000
Total of the maximum of annual trade which can pass from West to East on the canal, - - -	$60,090,000
And, as the trade from East to West, or the return trade, may be supposed equal in value to the above, or to	60,090,000
It follows that the maximum of trade which can pass in both directions, will be, in one year, - -	$120,180,000

Before terminating these considerations on the physical advantages produced by the canal, we think that, in strict justice to this work, we should submit the following observations, having for object to show, that the general results above presented are below the truth, and must be regarded as minimum quantities.

1st. All our calculations have been based on the population of the census of 1820, while, in strictness, they should have been made on the probable population which will exist at the period when the canal will go into operation. But, in supposing that the canal be commenced in 1827, it can scarcely be completed before 1838: at this period, our population, at the present rate of increase, will be above one-half more than it was in 1820.

2d. We have not taken into account the contemplated canal from Pittsburg to Lake Erie, and which may be considered the continuation of the Chesapeake and Ohio Canal, as far as this Lake. The Chesapeake being then united with Lake Erie by a water communication of about 460 miles in extent, (a distance nearly equal to that from the port of Erie to Albany,) all the territory bordering on the great Lakes, with the exception of Ontario, must participate in the trade of the Chesapeake and Ohio Canal. Combined with this work, the Ohio and Erie Canal would have offered results much more favorable than those we have presented, in the comparisons which we have made between the expense of construction, on the one hand, and, on the other, the augmentation of territorial value; the successive increase of products; the extension of trade, both inland and foreign; and the revenue, strictly so called, of the work. These results would have been by so much the more advantageous, as, taking an equal distance, the Ohio and Erie Canal will be much less expensive than the Chesapeake and Ohio Canal.

3d. Neither have we spoken, by anticipation, of the advantages to be afforded to this work by the proposed canal from Georgetown to Baltimore, and of which the surveys, at present in execution, promise the most favorable results.

4th. In the estimation of the return trade, one-fifth would have been nearer to the truth than one-tenth; but, in adopting this last proportion, our object has been to keep ourselves, as to the revenue of the canal, as near as possible to the minimum.

5th. Finally, in all our computations, we have taken care to compare, separately, the expense of construction of the whole canal, and that of the Eastern and Western Sections taken together. Our object, in thus proceeding, was, to show how unfavorable to the different results was the Middle Section, which, being only the fifth part of the length of the canal, still counts for five-elevenths of the expense of the whole. Our object has also been to show how desirable it is that proper investigations should be made to determine, as has been before suggested in this report, the comparative advantage between a canal and a rail-way, to connect Cumberland with the mouth of Casselman's river.

Before leaving this subject, we hope to be permitted to express our acknowledgments to General Walter Smith, of Georgetown, D. C., for the zeal and care with which he has kindly furnished us with data which were indispensable for forming the foregoing calculations. Without these data, it would have been impossible to have given to this subject of our report the extent which its importance deserves.

Having terminated this rapid view of the physical advantages offered by the Chesapeake and Ohio Canal, it only remains for us, in conclusion, to submit some ideas on the other advantages which will result from the execution of this work.

One of the most important results of the acquisition of Louisiana, has been, to afford to the country West of the Alleghany, an outlet to the sea. The tide of emigration then flowed towards those fertile regions, and their population now increases with a rapidity to which no other country can furnish a parallel. Already a part of this population finding itself placed at too great a distance from the Gulf, and the amount of its productions being considerable, demands new outlets: that by the Mississippi is not sufficient for them; they require more. A chain of mountains of secondary rank, such as the Alleghanies, cannot bar the progress of a nation so enterprising as ours, and still less darken the future prospects of this great federal empire. This chain should be broken at every point where it is practicable, and the most prudent policy appears to be to hasten in the execution.

The State of New York, in turning this chain to the North, has shown the first example; and, while in reward of its enterprise, its prosperity advances with rapid strides, the illustrious citizen whose elevated views especially advanced this great work, has enrolled his name on the list of the benefactors of his country.

But, scarcely has this communication through the State of New York gone into entire and active operation, before it is perceived that,

in a short time, it will not be sufficient to satisfy the demands made upon it. Thus, a few years will have sufficed to produce results which exceed what the most sanguine hopes could have anticipated. This fact, taken alone, proves that new communications will become indispensable.

New York and New Orleans are, at the present time, the only points towards which the products of the West can be economically directed. But, these two points, placed, the one to the North, the other to the South, have each a certain sphere of action, which cannot extend beyond certain limits; and there remains between their respective commercial range, if we may use this expression, a large extent of our territory, which, on account of its too great distance from each of these emporiums, is unable to transport its products to them, with profit.

These portions of our territory includes, more particularly, the States of Tennessee, Kentucky, Ohio, Indiana, and Illinois, and the Michigan Territory; to these we might have added the Western parts of Virginia and Pennsylvania. But, limiting ourselves to the States and Territory cited, we find an extent of 250,000 square miles of fertile country, whose population amounted, in 1800, to 377,567, and in 1820, to 1,779,949. These States, if deprived of economical communications with the Ocean, cannot attain a reasonable degree of commercial prosperity; with the exception of cotton, they all cultivate nearly the same productions, and consequently they cannot possess an internal trade among themselves of much activity; it is only by exporting these productions that they can, in this respect, contribute to and participate in the whole prosperity of the Union.

In such a state of things, the question of policy is not, it seems to us, to know if these communications will be profitable, but, in fact, to ascertain if the number of those which are practicable, will be sufficient. We will observe, on this point, that this extent of 250,000 square miles is at least equal to the kingdoms of France and the Netherlands taken together, of which the population is not less than 35 millions of inhabitants. These two wealthy kingdoms possess, together, a development of coast of 2,200 miles, besides eight large navigable rivers, which form a communication between the interior of the country and the Ocean. The Western States referred to, may be considered as capable to support, at a future day, a population equal to that of those kingdoms. The great fertility of the soil, and the commercial enterprise which characterises our population, leave no doubt on this head; and if proofs were, however, necessary, we need only to recollect that, at the present time, when our manufactures are yet in their infancy, our inland trade is already the third in amount of that of France, while our foreign trade is equal to that of this fine kingdom. These States will, therefore, require a certain number of outlets to facilitate the exportation of all their products, and the importation of the returns; and it is doubtful if even four of these outlets will be found practicable between the Juniata and the Savannah river, even by the combination of canals and rail-ways. Thus, in-

stead of fearing that these communications will not be profitable, we should rather apprehend that, at a future day, they will be found insufficient for the passage of the trade between the West and the East. The insurmountable obstacles opposed by nature are thus the only ones which should limit our efforts; for, the more economical outlets we can open through this chain, the more will the resources of the West develop themselves, and the more will the East and the West become united by indissoluble bonds of a common interest.

Among these outlets, the Chesapeake and Ohio Canal holds a conspicuous rank; its degree of practicability is well settled; the relations between the expense of its construction and its physical advantages, have been established, we trust, in a satisfactory manner; but it also offers other advantages, which it is important to enumerate.

It opens into the Chesapeake, whose central situation on our Atlantic coast is equally favorable for its trade with the South or with the North; and while, in time of war, this trade will find protection behind the ægis of our Naval forces in Hampton Roads, the canal will assure to our maritime establishments in this quarter, abundant resources of every kind; a circumstance which will associate still more intimately the regions of the West with our destinies on the Ocean. These Naval establishments will also be placed in communication with Pittsburg, a city destined to become the great manufacturing emporium of the West, and of which the different branches of industry will be of the greatest importance for Naval supplies.

The Chesapeake and Ohio Canal also enjoys, in common with all those which can be made to traverse the ridge of the Alleghany, the inestimable advantage of furnishing to the States and Territories whose exportations and importations are made through the Mississippi, a safe communication with the sea, in case the circumstances of war should close or render dangerous the passage by the mouth of this great artery of the regions of the West. In order properly to appreciate the value of such an advantage, it is proper here to observe, that the coast of Louisiana does not offer any position from which our fleets can, in an effectual manner, protect the outlet of the Mississippi into the Gulf. The coast itself of Louisiana will soon be invulnerable, but the opening of this great river will remain always exposed to blockade as a commercial outlet. The fate of Cuba is yet uncertain, and our establishments at Pensacola, unfortunately, are not of a nature to admit vessels of the first classes. Thus, it is not sufficient to have defended the coast of Louisiana, and to have insured the possession of the Delta of the Mississippi: it is also necessary to assure to the valley of this noble river, lateral outlets to the Ocean. Without such outlets, the commerce of extensive districts may, in the course of events, become, as it were, entirely paralyzed, and the consequences would be beyond all description.

The Chesapeake and Ohio Canal not only offers the shortest outlet between the Ohio and the Atlantic, but also, connected with the contemplated canal from Pittsburg to Lake Erie, it will afford a direct communication between the upper Lakes and the Ocean, and will

form a military line of operations which cannot, in any circumstances, be cut off or intercepted. This line will join the centre of our Northern with the centre of our Atlantic frontier, and with the Capital of the Union. In time of war, it will give every facility to concentrate, rapidly and economically, on either of these frontiers, troops and military supplies of every kind; and thus will give them, particularly the Northern frontier, a degree of strength which expensive works of defence could not procure.

Such are the principal considerations which, in our humble opinion, have appeared to us proper to demonstrate the degree of importance of the great work which forms the subject of the present report.

All which is respectfully submitted.

S. BERNARD, *Brig. Gen.*
Member of the Board of Internal Improvements.

WM. TELL POUSSIN, *Capt. Top. Engs.*
Assistant to the Board.

WILLIAM HOWARD, *Civil Eng.*
Assistant to the Board.

Washington City, Oct. 23, 1826.

CHESAPEAKE AND OHIO CANAL---EASTERN SECTION. SUBDIVISION 1.

Map sheet A. No. 1. Profile sheet A. No. 8.		EXCAVATION.						EMBANKMENT.						WALING.					AQUEDUCTS.						
Length of portion.	Distance from beginning of subdivision.	Distance in yards.	Reduced area. C. Y.	Cubic yards.	No. of stages.	Price.	Amount.	Distance in yards.	Reduced area. C. Y.	Cubic yards.	No. of stages.	Price.	Amount.	Distance in yards.	Reduced area. C. Y.	Cubic yards.	Price.	Amount.	Length in yards.	No. of arches.	Span of arches.	Height of piers.	Amount.	No.	Length in feet.
Yards.	*Miles. Yards.*					*Dolls.*	*Dollars.*					*Dolls.*	*Dollars.*				*Dolls.*	*Dollars.*			feet.	feet.	*Dollars.*		
380	0 380	380.00	63.40	24,092	-	.377	9,082 68	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-
733	0 1,113	733	67.1	49,184	-	.343	16,870 11	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-
1,887	1 1,240	1.887	22.5	42,458	-	.20	8,491 60	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-
333	1 1,573	333	22.5	7,492.5	-	.17	1,273 72	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-
300	2 113	300	41.47	12,441	-	.204	2,537 96	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-
866	2 979	866	22.5	19.485	-	.17	3.312 45	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-
240	2 1,219	240	137.1+	32,913	-	.204	6,714 37	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-
533	2 1,752	-	-	-	-	-	- -	278.66	666.66	92,830	-	.20	18,566 00	-	-	-	-	-	-	-	-	-	-	-	-
																			60	3	1 of 50 2 of 25	22	39,703	-	-
								200	533.33	106,666	-	.20	21,333 20	-	-	-	-	-	-	-	-	-	-	-	-
		5,940	13.3	79,002	-	.14	11,06[illegible] 28	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-
2,666+	4 898	2.666	22.5	60.000	-	.17	10,20[illegible] 00	- -	- -	90,004	-	.20	18,000 80	-	-	-	-	-	-	-	-	-	-	-	-
166	4 1.064	166	92.25	17,293.5	-	.343	5,93[illegible] 67	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-
800	5 104	800	97	77.600	-	.343	26.61[illegible] 80	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-
667	5 771	667	67.22	44,836	-	.34	15,24[illegible] 24	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-
1,333+	6 344	1.333+	53.75	71,666	-	.34	24,36[illegible] 44	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	8	62
220	6 564	-	-	-	-	-	- -	220	69.33	15,252.6	2	.12	1,830 31	-	-	-	-	-	-	-	-	-	-	-	-
5,500	9 784	5,500	22.5	12.375	-	.14	17,32[illegible] 00	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-
		112.17	200	22,434	-	.34	7,62[illegible] 56	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-
500	9 1.284	-	-	-	-	-	- -	500	116.34	58,170	2	.20	11,634 00	500	16.04	8020	4	32,080	-	-	-	-	-	-	-
796	10 320	796	47.2+	37,576	-	.34	12,77[illegible] 84	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-
5,170	13 210	5,170	22.5	116,325	1	.14	16,28[illegible] 50	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-
880	13 1.090	880	58.41	51,400.8	1	.14	7,196 11	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	3	2
5,290	16 1,100	-	-	-	-	-	- -	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous items of subdivision 1.				-	-	-	- -	- -	- -	- -	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-
29 260=	16 1,100	*Miles. Yards.* 16 609		778,573.8			202,912 33	1,198.66		362.922.6			71,364 31	500				32,080	60				39,703	11	

DIVISION 1.

From Cumberland to South Branch Potomac.

AQUEDUCTS.					LOCKS.				CULVERTS.			BRIDGES.			SUNDRIES.										TOTAL.
															PUDDLING.			PAVING.			FENCING.			SUNDRIES.		
Length in yards.	No. of arches.	Span of arches.	Height of piers.	Amount.	No.	Length in feet.	Price.	Amount.	No.	Price.	Amount.	Number.	Price.	Amount.	Cubic yrds.	Price.	Amount	Square yrds.	Price.	Amount.	Distance.	Price.	Amount.		Amount.	
		feet.	feet.	*Dollars.*			*Dollars.*	*Dollars.*		*Dolls.*	*Dollars.*		*Dollars.*	*Dollars.*		*Dolls.*	*Dollars.*		*Dolls.*	*Dollars.*	*miles.*	*Dolls.*	*Dollars.*		*Dollars.*	*Dolls. Cts.*
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.082 68
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.870 11
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,491 60
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.273 72
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.537 96
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.312 45
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.714 37
60	3	1 of 50 2 of 25	22	39,703	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18,566 00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39.703 00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21,333 20
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	dam	1,500	12.560 28
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28.200 80
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.931 67
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26.616 80
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.244 24
-	-	-	-	-	8	62.5	1,500	93,750	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	118.116 44
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 830 31
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17,325 00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.627 56
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43,714 00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12,775 84
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,285 50
-	-	-	-	-	3	21	1,500	31,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38.696 11
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	tow path	11,000	11,000 00
-	-	-	-	-	-	-	-	-	15	300	4,500	3 of 500 7 of 300		3,600	74,800	.12	8,976	11,290	.81	9,144 09	16½	900	14,850	-	-	41,070 90
60				39,703	11			125,250	15		4,500	10		3,600	74,800		8,976	11,290	.81	9,144 09	16½	900	14,850		12,500	524,880 51

CHESAPEAKE AND OHIO CANAL---EASTERN SECTION. SUBDIVISION 2.

Map sheet A. Nos. 1 & 2. Profile do. A. Nos. 8 & 9.		EXCAVATION.						EMBANKMENT.						WALLING.					AQUEDUCTS.					
Length of Portion.	Distance from beginning of subdivisions.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of Stages.	Price.	Amount.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of Stages.	Price.	Amount.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	Price.	Amount.	Length in yrds	No. of arches.	Span of arches.	Height of piers.	Amount.	No.
Yards.	*Miles. Yards.*					*Dolls.*						*Dolls.*									ft.	ft.		
6,050	3 770	6,050	22. 5	136,125.	1	.14	$ 19.057 50	533	13	6,929.	2	.20	$ 1,385 80	166	58.17	9 656+	$4	$ 38,624 88	40	1	-	-	$ 4,441 60	2
460	3 1.230	- -	- -	- -	-	-	- -	460	116.3	53,360.	2	.20	10,672 00	460	16.04	7,378+	3	22,135 20	-	-	-	-	- -	-
1.640	4 1.110	1.640	112.17	183.958.8	1½	.34	62,545 99	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	-
2 860	6 450	2,860	7,192.+	254,540.	1½	.34	86,543 60	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	-
3.520	8 450	3.520	22. 5	79.000.	1	.14	11,088 00	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	-
660	8 1,110	- -	- -	- -	-	-	- -	660	116	76,560.	2	.20	15,312 00	660	16.04	11,586+	3	34,759 20	-	-	-	-	- -	-
1.400	9 750	1.400	22. 5	31,500.	1	.14	4,410 00	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	-
3.400	11 630	- -	- -	- -	-	-	- -	3,400	81	275,400.	2	.20	55,080 00	3,400	23.34	79,356	3	238,068 00	-	-	-	-	- -	-
2.200	12 70	2.200	22. 5	48,510.	1	.20	9,702 00	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	2
1,400	12 1,470	1 400	67.	93,800.	1½	.34	31.892 00	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	-
1.050	13 760	1,050	22. 5	24,150.	1	.20	4,830 00	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	-
2,300	14 1,300	- -	- -	- -	-	-	- -	2,300	81	186,300.	2	.20	37,260 00	2,300	23.34	53,682	3	161,046 00	-	-	-	-	- -	-
1.000	15 540	1,000	44.	44,000.	2	.22	9,680 00	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	-
3,000	17 20	3.000	34.20	102.600.	2	.21	21.546 00	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	-
3,400	18 1.660	3 400	34.58+	117.600.	1½	17+	19,992 00	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	-
4.400	21 780	4.400	34.58+	152.188.	1	.17	25.872 00	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	2
2,800	23 60	2.800	22.52+	63.066.	2	.21	13,244 00	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	-
1,800	24 100	1,800	54.93+	97.978.	1½	.273	26,748 00	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	-
3.000	25 1,340	- -	- -	- -	-	-	- -	3,000	39	117,000.	2	.20	23,400 00	3,000	10.69	32,070	3	96,210 00	-	-	-	-	6,584 00	2
4.300	28 360	4.300	34.22+	147.160.	2	.206	30.315 00	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	-
2,200	29 800	2 200	54.43+	119.750.	2	.273	32.692 00	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	-
1.800	30 840	1.800	33.78+	60.814.	1	.14	8.514 00	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	-
2.500	31 1.580	2.500	95.97+	239.927.	1½	.206	49.425 00	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	-
5,020	34 1,320	5,020	27.21+	136,623.	1	.17	23,226 00	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	- -	2
Miscellaneous items of subdivision.				- -	-	-	- -	- -	-	- -	-	-	- -	-	-	- -	-	- -	-	-	-	-	19,093 00	-
61,160 =	34 1.320	52.340= m. yds 29 1,300		2.133,289.8			491,323 09	10,353		715,549.			$ 143,109 80	9.986				$ 590,843 28					$ 30,118 60	

DIVISION 2.

From the South Branch of Potomac to the mouth of the Great Cacapon river.

	AQUEDUCTS.					LOCKS.			CULVERTS.			BRIDGES.			SUNDRIES											TOTAL.
															PUDDLING			PAVING.			FENCING.			SUNDRIES.		
Amount.	Length in yds	No. of arches.	Span of arches.	Height of piers.	Amount.	No.	Li, 1 fc.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	Cubic yrds.	Price.	Amount.	Sq. yds.	Price.	Amount.	Distance.	Price.	Amount.	Waste weirs.	Amount.	Dollars. Cents.
			ft.	ft.																							
$ 38,624 88	40	1	-	-	$ 4,441 60	2		-	$ 27,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90,509 78
22,135 20	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32,807 20
- -	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	62,545 99
- -	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	86,543 60
- -	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11,088 00
34,759 20	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50,071 20
- -	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,410 00
238,068 00	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	293,148 00
- -	-	-	-	-	- -	2	1	1,500	24,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33,702 00
- -	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31,892 00
- -	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,830 00
161,046 00	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	198,306 00
- -	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9 680 00
- -	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21,546 00
- -	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19,992 00
- -	-	-	-	-	- -	2	1	1,500	24,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49,872 00
- -	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13,244 00
- -	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26,748 00
96,210 00	-	-	-	-	6,584 00	2	1	1,500	24,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	143 610 00
- -	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36,899 00
- -	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32,692 00
- -	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,514 00
- -	-	-	-	-	- -	-		-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	68,518 00
- -	-	-	-	-	- -	2	1	1,500	24,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47,226 00
- -	-	-	-	-	19,093 00	-		-	- -	36	$ 300	$ 10,800	{1 at 8 at	$ 500 300}	$ 2,900	314,160	.12	37,699	12,320	.81	9,979 02	26	.900	23,400	3	1,200	85,978 20
$ 590,843 28					$ 30,118 60				$ 123,000	36		$ 10,800	9		$ 2,900	314,160		37,699	12,320		9,979 02	miles. 26		23,400		1,200	1,464,372 97

CHESAPEAKE AND OHIO CANAL.—Eastern Section.

SUBDIVISION 3.

Map, Sheet A, Nos. 2 & 3. Profile, Sheet A, No. 9.		EXCAVATION.						EMBANKMENT.						WALLING.					AQUEDUCTS.						
Length of portion.	Distance from beginning of subdivision.	Distance in Yards.	Reduced area. S. Y.	Cubic Yards.	No. of Stages.	Price.	Amount.	Distance in yards.	Reduced area. S. Y.	Cubic Yards.	No. of Stages.	Price.	Amount.	Distance in yards.	Reduced area. S. Y.	Cubic Yards.	Price.	Amount.	Length in yards.	No. of Arches.	Span of Arches.	Height of Piers.	Amount.	No.	Lif fe
Yards.	*Miles. Yards.*					*Cts.*	*Dollars.*					*Cts.*	*Dollars.*				*Dolls.*	*Dollars.*			ft.	ft.	*Dollars.*		
Feeder	-	3,960	8.	31,680	-	14	4,435 20	-	-	-	-	-	-	-	-	-	-	-	413	6	100	42	45,577	-	
6,600	3 1,320	6,600	22.5	148,500	-	14	20,790	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
660	4 220	-	-	-	-	-	-	660	116.	76,560	2	20	15,312	660	16.04	10,586	3	31,758	-	-	-	-	-	-	
2,640	5 1,100	2,640	22.5	59,400	-	14	8,316	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1,320	6 660	-	-	-	-	-	-	1,320	58.	76,560	2	20	15,312	1,320	14.	18,480	3	55,440	-	-	-	-	-	-	
14,520	14 1,100	14,520	22.5	326,700	-	14	45,738	-	-	53,020	-	20	10,604	-	-	-	-	-	-	-	-	-	8,857 / 10,878	4	
660	15	660	67.	44,220	-	34	15,034	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3,740	17 220	3,740	22.5	84,150	-	14	11,781	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Miscellaneous items of subdivision				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
29,920=	17 220	*miles yds.* 18 440		694,650			106,094 20	1,980		206,140			41,228	1,980				87,198	413				65,312	4	

SUBDIVISION 4.

Map, Sheet A, Nos. 3 & 4. Profile, Sheet A, No. 10.																									
Feeder	-	4,620	8.	36,960	1	14	5,174 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12,540	7 220	12,540	22.5	882,150	1	14	123,501	220	39.6	8,712	2	20	1,742 40	220	6.4	1,400	3	4,200	66	3	30	15	45,380	-	
165	7 385	165	880.	145,200	2	30.6	44,431	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
660	7 1,045	600	48.	28,800	1	14	4,032	440	40.80	17,952	2	20	3,590 40	440	6.38	2,807	3	8,421	-	-	-	-	-	2	
660	7 1,705	600	48.	28,800	1	14	4,032	660	210.	138,600	2	20	27,720	660	31.03	20,480	5 18	106,086 40	-	-	-	-	-	2	
880	8 825	-	-	-	-	-	-	880	116.	102,080	2	20	20,416	880	16.	14,080	3	42,240	-	-	-	-	-	-	
1,540	9 605	-	-	-	-	-	-	1,540	140.	215,600	2	20	43,120	1,540	31.	47,740	3	143,220	40	1	30	16	14,538	-	
6,050	12 1,375	6,050	22.5	136,125	1	14	19,057	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
2,090	13 1,705	-	-	-	-	-	-	2,090	116.	242,440	-	20	48,488	2,090	16.	33,440	3	100,320	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	220	39.6	8,712	2	20	1,742 40	-	-	-	-	-	-	-	-	-	-	-	
4 290	16 715	4,290	22.5	96,525	1	14	13,513 50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Miscellaneous item of subdivision				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
23,875=	16 715	*miles yds.* 16 705		135,456			213,740 90	6,050		734,096			146,819 20	5,830				404,487 40	106				59,918	5	

SUBDIVISION 3.

From opposite to the mouth of Great Cacapon river to the mouth of Licking creek.

AQUEDUCTS.					LOCKS.				CULVERTS.			BRIDGES.			SUNDRIES.											TOTAL.	
															PUDDLING.			PAVING.			FENCING.			SUNDRIES.			
Length in yards.	No. of Arches.	Span of Arches.	Height of Piers.	Amount.	No.	Lift in feet.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	Cubic yards.	Price.	Amount.	Squ. yards.	Price.	Amount.	Distance.	Price.	Amount.		Amount.	Dollars.	Cents
		ft.	ft.	Dollars.			Dolls.	Dolls.		Dolls.	Dolls.		Dolls.	Dolls.		Cts.	Dolls.		Cts.	Dolls.	Miles.	Dolls.	Dolls.				
413	6	100	42	45,577	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dam,	2,500	52,512	20
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20,790	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47,070	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,316	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70,752	
-	-	-	-	8,857 10,878	4	32	1,500	48,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Basin at Hancock; Removing turnpike b.	3,200 18,000	145,277	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15,034	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11,781	
-	-	-	-	-	-	-	-	-	30	300	9,000	4 5	500 300	3,500	14,960	12	1,795	17,600	81	14,256	16½	900	14,511	3 waste weirs.	1,200	44,262	
413				65,312	4			48,000			9,000			3,500			1,795			14,256			14,511		24,900	415,794	20

SUBDIVISION 4.

From the mouth of Licking Creek to the Great Conococheague.

-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dam	1,500	6,674	
66	3	30	15	45,380	-	-	-	-	1	-	800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	175,623	40
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44,431	
-	-	-	-	-	2	15	1,500	22,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38,543	40
-	-	-	-	-	2	15	1,500	22,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	160,338	40
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	62,556	
40	1	30	16	14,538	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200,878	
-	-	-	-	-	1	8	1,500	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31,057	
-	-	-	-	-	-	-	-	-	1	-	800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	149,608	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,742	40
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13,518	50
-	-	-	-	-	-	-	-	-	35	300	10,500	4 6	500 300	3,800	95,370	12	11,444	18,120	81	14,677	17	900	15,300	4 Waste weirs.	1,600	57,321	
106				59,918	5			57,000			12,100			3,800			11,444			14,677			15,300		3,100	942,386	50

om Williamsport to the mouth of th

DRIES.						
AVING.		FENCING.			SUNDRIES.	
Price.	Amount.	Distance.	Price.	Amount.		Am
Cents.	*Dollars.*	*Miles.*	*Dolls.*	*Dollars.*		*D*
-	-	-	-	-	dam	2
-	-	-	-	-	- -	
-	-	-	-	-	- -	
-	-	-	-	-	- -	
-	-	-	-	-	- -	
-	-	-	-	-	- -	
-	-	-	-	-	- -	
-	-	-	-	-	- -	
-	-	-	-	-	- -	
-	-	-	-	-	- -	
-	-	-	-	-	- -	
-	-	-	-	-	- -	
-	-	-	-	-	- -	

Map sheet A. No. 4. Profile sheet A. No. 10.		EXCAVATION.						EMBANKMENT.						WALLING.					AQUEDUCTS.					LO		
Length of portion	Distance from beginning of subdivision.	Distance in yards.	Reduced area. S. Y.	Cubic Yards.	No. of stages.	Price.	Amount.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of stages.	Price.	Amount.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	Price.	Amount.	Length in yrds.	No. of arches.	Span of arches.	Height of piers.	Amount.	No.	Length in feet.	Pr
	Miles. Yards.					Cents	Dollars. Cts.					Cents.	Dollars.				$	Dollars.			Feet.	Feet.	Dollars.			Do
Feeder	- -	5.720	8.	45,760	1	14	6,406 40	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
1.100	0 1,100	1,100	22.5	24,750	1	14	3,465 00	-	-	-	-	-	-	-	-		-	-	76	4	30	15	56,262	4	-	
Basin	- -	-	-	19,540	1½	17	3,321 00	-	-	-	-		-	-	-	700	3	2,100	-	-	-	-	-	-	-	
1.100	1 440	1.100	67.	73,700	2	34	25.058 00	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
1.980	2 660	1,980	23.27+	46.090	1	14	6,452 60	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
880	2 1,540	880	50.	44,000	2	20	8.800 00	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
1.760	3 1,540	1.760	22 5	39,600	1	17	6.732 00	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
440	4 220	440	92.	40,480	2	34	13,763 20	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
1.100	4 1.320	1,100	22.5	24,750	1	14	3,465 00	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
660	5 220	660	67.	44.220	-	30	13,266 00	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
660	5 880	660	92.	60,720	2	34	20,644 80	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
440	5 1,320	440	22.5	9 900	1	14	1,386 00	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
440	6	440	35.	15,400	-	27	4,158 00	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
1,980	7 220	1,980	22.5	44,550	-	17	7,573 50	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
880	7 1.100	-	-	- -	-	-	- -	880	58	51,040	2½	25	12.760 00	880	23.4	20.592	3	61,776	-	-	-	-	-	-	-	
440	7 1.540	440	67.	29,480	2	20	5,896 00	-	-	-		-	-	-	-		-	-	-	-	-	-	-	-	-	
440	8 220	-	-	- -	-	-	- -	440	58	25,520	-	25	6,380 00	440	23.4	10,296	3	30,888	-	-	-	-	-	-	-	
3.080	9 1.540	3.080	35.4	109.032	1½	27	29,438 64	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
660	10 440	660	30.	19,800	-	24	4.752 00	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	2	14	1
2.420	11 1.100	-	-	- -	-	-	- -	2,420	105	254.100	-	20	50,820 00	2,420	31	75.020	3	225.060	-	-	-	-	-	-	-	
1.540	12 880	-	-	- -	-	-	- -	1,540	58	89.320	-	20	17,864 00	1,540	23	35.420	3	106,260	-	-	-	-	-	3	21	1
Dam	- -	-	-	- -	-	-	- -	200	58	11.600	4	42	4,872 00	200	10.4	2,140	4	8,560	-	-	-	-	-	1	-	
3.080	14 440	3,080	73.1	225,148	1½	20	45,029 60	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
1,760	15 440	-	-	- -	-	-	- -	1,760	30	52,800	-	20	10,560 00	1,760	16	28,160	3	84,480	-	-	-	-	-	-	-	
4.400	17 1.320	4,400	43.	189,200	-	26	49,192 00	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
1.760	18 1.320	-	-	- -	-	-	- -	1,760	20.4	35.904	-	20	7,180 80	1,760	10.7	18,832	3	56,496	-	-	-	-	-	-	-	
5.940	22 220	5,940	23.6	169,884	-	20	33.976 80	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
1.760	23 220	-	-	- -	-	-	- -	1,760	40	70.400	-	20	14,080 00	1,760	10.7	18,832	3	56.496	-	-	-	-	-	-	-	
2,640	24 1.100	2.640	92.	242.880	-	34	82,579 20	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
1.760	25 1.100	-	-	- -	-	-	- -	1,760	20	35,200	-	20	6,040 00	1,760	16.4	11,264	3	33,792	-	-	-	-	-	-	-	
4,400	22 220	4.400	22.5	99.000	-	17	16,830 00	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	4	-	
1,320	28 1.540	1,320	67.	88,440	-	20	19.456 80	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
990	29 770	990	49.	48,510	-	22	10,672 20	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
Miscellaneous items of subdivision		- -			-	-	- -	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	
Yards. 51 810=	Miles. Yds. 29 770	Miles. Yds. 26 1,450		2,154,834			422,314 74	12,520		625.884			180,556 80	12.520		220,556		665.908	76				56.262			

BDIVISION 5.

From Williamsport to the mouth of the Antietam

AQUEDUCTS.				LOCKS.				CULVERTS.			BRIDGES.			SUNDRIES.										TOTAL.
														PUDDLING.			PAVING.			FENCING.			SUNDRIES.		
No. of arches.	Span of arches.	Height of piers.	Amount.	No.	Length in feet.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	Cubic yards.	Price.	Amount.	Square yards.	Price.	Amount.	Distance.	Price.	Amount.		Amount.	
	Feet.	Feet.	Dollars.			Dollars.	Dollars.		Dollars.	Dollars.		Dollars.	Dollars.		Cents.	Dollars.		Cents.	Dollars.	Miles.	Dolls.	Dollars.		Dollars.	Dollars. Cts.
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	dam	2,500	8.906 40
4	30	15	56,262	4	-	-	45,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	104,727 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	5,421 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	25,058 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	6,452 60
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	3,800 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	6,732 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	13,763 20
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	3.465 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	13.266 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	20.6[illegible]4 80
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	1.386 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	4,158 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	7,573 50
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	74.536 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	5,896 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	37,268 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	29,438 64
-	-	-	-	2	14	1,500	21,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	25,752 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	275,880 00
-	-	-	-	3	21	1,500	31,500		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	153,624 00
-	-	-	-	1	-	-	18,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	walling & gate	8,180	39.612 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	waste gate, &c.	1.600	46.629 60
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	95,040 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	49,192 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	63.676 80
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	33,976 80
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	70.576 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	82.579 20
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	39.832 00
-	-	-	-	4	-	-	43.500		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	60.330 00
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	19.456 80
-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	10.672 20
-	-	-	-	-	-	-	-		2 1,200 41 300	14.700	2 500 5 300	2,500	209,440	12	25,132	70,920	81	57,445	28	900	25,200	4 waste weirs	1,600	126.577 00
			56,262				159,000			14,700		2.500			25,132	70,920		57,445			25.200		13.880	1.572.898 54

Map Sheet A. No. 4. Profile Sheet A. No. 11.			EXCAVATION.						EMBANKMENT.						WALLING.					AQUEDUCTS.					LO	
Length of portion.	Distance from beginning of subdivision.		Distance in Yards.	Reduced area. S. Y.	Cubic Yards.	No. of Stages.	Price.	Amount.	Distance in Yards.	Reduced area. S. Y.	Cubic Yards.	No. of Stages.	Price.	Amount.	Distance in Yards.	Reduced area. S. Y.	Cubic Yards.	Price.	Amount.	Length in yards.	No. of arches.	Span of arches.	Height of Piers.	Amount.	No.	Lift in Feet.
Yards.	*Miles.*	*Yards.*					*Cents.*	*Dolls.*					*Cents.*	*Dolls.*				*Dolls.*	*Dolls.*			ft.	ft.	*Dolls.*		
Feeder.	-		1,980	8.	15,840	1	14	2,217 60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.090	1	330	2,090	67.	140,030	2	21	29,406 80	-	-	-	-	-	-	-	-	-	-	-	76	4	30	-	56,262	2	16
440	1	770	-	-	-	-	-	-	440	58	25,520	2	20	5,104	440	16	7,040	3	21,120	-	-	-	-	-	-	-
440	1	1.210	440	49.	21,560	2	21	4,527 60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,980	2	1,430	1,980	23.	45,540	2	21	9,563 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
220	2	1,650	-	-	-	-	-	-	-	-	-	-	-	-	220	16	3,520	3	10,560	-	-	-	-	-	-	-
440	3	330	440	54.	23,760	2	21	4,989 60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.320	3	1,650	1,320	42.	55,440	2	21	11,642 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
300	4	190	-	-	-	-	-	-	300	50	15,000	2	20	3,000	300	14	4,200	3	12,600	-	-	-	-	-	-	-
3.300	5	1,730	3,300	22.5	74,250	1	17	12,622 50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
440	6	410	440	67.	29,480	2	34	10,023 20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,540	7	190	1,540	22.5	34,650	2	21	7,271 50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5,500	10	410	-	-	-	-	-	-	5,500	58	319,000	2	20	63,800	5,500	16	88,000	3	264,000	-	-	-	-	-	7	56
			1,180	24.	28,320	-	1 10	31,152	220	40	8,800	4	42	3,696	220	12	2,640	4	10,560	-	-	-	-	-	Guard	-
Miscellaneous items of subdivision					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18,010=	10	410	14,710		468,870			123,416 10	6,460		368,320			75,600			105.400		318,840	-				56,262		

SUBDIVISION 6.

From the mouth of Antietam to below Harper's Ferry.

		AQUEDUCTS.					LOCKS.				CULVERTS.			BRIDGES.			SUNDRIES.											TOTAL.	
ice.	Amount.	Length in yards.	No. of arches.	Span of arches.	Height of Piers.	Amount.	No.	Lift in Feet.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	PUDDLING.			PAVING.			FENCING.			SUNDRIES.				
																	Cubic Yds.	Price.	Amount.	Sq. Yds.	Price.	Amount.	Distance in Miles.	Price.	Amount.			Amount.	Dollars.	Cents.
lls.	Dolls.			ft.	ft.	Dolls.			Dolls.	Dolls.		Dolls.	Dolls.		Dolls.	Dolls.		Cents.	Dolls.		Cts.	Dolls.		Cts.	Dolls.			Dolls.		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		a dam	1,500	3,717	60
-	-	76	4	30	-	56,262	2	16	1,500	24,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	109.668	30
3	21,120	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26.224	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.527	60
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.563	40
3	10,560	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.560	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,989	60
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.642	40
3	12,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15,600	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12,622	50
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.023	20
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.271	50
3	264.000	-	-	-	-	-	7	56	1,500	84,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	411,300	00
4	10,560	-	-	-	-	-	Guard	-	-	28,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Waste Gate & Weir		1,600	75,008	00
-	-	-	-	-	-	-	-	-	-	-	13	300	3,900	2 / 2	500 / 300	1,600	119,680	12	14,361	7,040	81	5,702	10	900	9,000	-	-	-	34 563	00
	318,840	-				56,262				136,000			3,900			1,600	-		14,361			5,702			9,000			3,100	747,781	10

Map, Sheet No. 5. Profile, Sheet No. 11.			EXCAVATION.						EMBANKMENT.						WALLING.					AQUEDUCTS.					LO		
Length of portion.	Distance from beginning of subdivision.		Distance in Yards.	Reduced area. S. Y.	Cubic Yds.	No. of Stages.	Price.	Amount.	Distance in Yards.	Reduced area. S. Y.	Cubic Yds.	No. of Stages.	Price.	Amount.	Distance in Yards.	Reduced area. S. Y.	Cubic Yds.	Price.	Amount.	Length in yards.	No. of Arches.	Span of Arches.	Height of Piers.	Amount.	No.	Lift in feet.	
Yards.	*Miles.*	*Yards.*					*Dolls.*	*Dolls.*					*Cents.*	*Dolls.*				*Dolls.*	*Dolls.*			*Feet.*	*Ft.*	*Dolls.*			
1,980	1	220	1,980	20.	89,600	1	10	43,560	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1,760	2	220	-	-	-	-	-	-	1,760	20	35,200	2	20	7,040	1,760	11	19,360	3	58,080	-	-	-	-	-	-	-	
2,200	3	660	-	-	-	-	-	-	2,200	20	44,000	2	20	8,800	2,200	4	8,800	3	26,400	-	-	-	-	-	-	-	
9,240	8	1,100	9,240	22.5	207,900	1	20	41,580	-	-	-	-	-	-	-	-	-	-	-	38	1	80	-	13,413	2	16	
2,420	10		2,420	22.5	54,450	1	22	11,979	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12,706	1	8	
880	10	880	-	-	-	-	-	-	880	40	35,200	2	20	7,040	880	12	10,560	3	31,680	-	-	-	-	-	-	-	
2,200	11	1,320	2,200	22.5	49,500	1	22	10,890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
880	12	440	-	-	-	-	-	-	880	58	51,040	-	20	10,208	880	16	14,080	3	42,240	-	-	-	-	-	-	-	
1,760	13	440	1,760	22.5	39,600	-	22	8,712	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1,320	14		1,320	150.	198,000	-	16	31,680	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
8,800	19		8,800	22.5	198,000	-	16	31,680	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12,706	-	-	
Miscellaneous item of subdivision					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
33,440=	19	00	15*m.* 1,320		787,050			180,081	5,720		165,440			33,088	5,720		52,806		158,400					48,825			

SUBDIVISION 7.

From below Harper's Ferry to the mouth of Monocacy.

AQUEDUCTS.					LOCKS.				CULVERTS.			BRIDGES.			SUNDRIES.										TOTAL.	
															PUDDLING.			PAVING.			FENCING.			SUNDRIES.			
Length in yards.	No. of Arches.	Span of Arches.	Height of Piers.	Amount.	No.	Lift in Feet.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	Cubic Yards.	Price.	Amount.	Sq. Yds.	Price.	Amount.	Distance.	Price.	Amount.			Amount.	Dollars.	Cents.
		Feet.	Ft.	Dolls.			Dolls.	Dolls.		Dolls.	Dolls.		Dolls.	Dolls.		Cents.	Dolls.		Cents.	Dolls.	Miles.	Dolls.	Dolls.			Dolls.		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43,560	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65,120	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35,200	00
38	1	30	-	13,413	2	16	1,500	24,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88,993	00
-	-	-	-	12,706	1	8	1,500	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36,685	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38,720	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,890	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52,448	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,712	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31,680	00
-	-	-	-	12,706	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44,386	00
-	-	-	-	-	-	-	-	-	25	3.00	7,500	5 14	500 300	6,700	37,400	12	4,488	3,000	81	2,430	19½	900	17,550	3 Waste Weirs.	1,200	39,868	00
				48,825				36,000			7,500			6,700			4,488			2,430			17,650		1,200	496,262	00

CHESAPEAKE AND OHIO CANAL—EASTERN SECTION.

Subdivision 8.

Map sheet A, Nos. 5 & 6. Profile sheet A, Nos. 11 & 12.			EXCAVATION.						EMBANKMENT.						WALLING.					AQUEDUCTS.					LOCK		
Length of portion.	Distance from beginning of subdivision.		Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of stages.	Price.	Amount.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of stages.	Price.	Amount.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	Price.	Amount.	Length in yards.	No. of arches.	Span of arches in feet.	Height of piers in feet.	Amount.	No.	Lift in feet.	P
							Cents.	Dollars.					Cents.	Dollars.				Dls.	Dollars.					Dollars.			D
Feeder -	-	-	7,480	22.5	168,300	1	17	28,611	110	40	4,400	4	42	1,848	110	10.7	1,177	4	4,708	-	-	-	-	-	1	Guard locks	
440	0	440	440	22.5	9,900	-	17	1,683	-	-	-	-	-	-	-	-	-	-	-	120	8	30	22	99,967	1	8	1,
1,980	1	660	1,980	67	132,660	2	24	31,838 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3,080	3	220	3,080	22.5	69,300	1	17	11,781	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12,706	-	-	
880	3	1,100	- -	-	-	-	-	- -	880	40	35,200	2	20	7,040	880	10.7	9,416	3	28,248	-	-	-	-	-	-	-	
880	4	220	880	67	58,960	1½	34	20,046 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
660	4	880	- -	-	-	-	-	- -	660	60	39,600	2	20	7,920	660	16	10,560	3	31,680	-	-	-	-	-	-	-	
11,880	11	440	11,880	22.5	267,300	1	17	45,241	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	8	1,
440	11	880	440	67	29,480	-	27	7,959 60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11,220	17	1,540	11,220	22.5	252,450	1	17	42,916 50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	8	1,
700	18	480	- -	-	-	-	-	- -	700	30	21,000	-	20	4,200	700	10.7	7,490	3	22,470	-	-	-	-	-	-	-	
1,860	19	580	1,860	22.5	41,850	1	17	7,114 50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Miscellaneous items of subdivision				-	-	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Yards.	Miles.		Miles. Yards.																								
34,020=	19	580	22 540		1,030,200			197,191 40	2,350		100,200			21,008	2,350		28,643		87,106					112,673			

Subdivision 8.

From the mouth of the Monococy to the mouth of Seneca Creek.

AQUEDUCTS.				LOCKS.				CULVERTS.			BRIDGES.			SUNDRIES.											TOTAL.
No. of arches.	Span of arches in feet.	Height of piers in feet.	Amount.	No.	Lift in feet.	Price.	Amount	No.	Price.	Amount.	No.	Price.	Amount.	PUDDLING.			PAVING.			FENCING.			SUNDRIES.			
														Cub. yds.	Price.	Amount.	Squ. yds.	Price.	Amount.	Distance.	Price.	Amount.		Amount.	
			Dollars.			Dollars.	Dollars.		Dollars.	Dollars.		Dollars.	Dollars.		Cents.	Dollars.		Cents.	Dollars.	Miles.	Dolls.	Dollars.		Dollars.	Dollars. Cts.
-	-	-	-	1	Guard locks	-	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47,167
8	30	22	99,967	1	8	1,500	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Waste gate and weir.	800	114,450
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31,838 40
-	-	-	12,706	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.487
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.288
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20,046 40
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39.600
-	-	-	-	1	8	1,500	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	57,241
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7,959 60
-	-	-	-	1	8	1,500	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	54.916 50
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26,670
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7,114 50
-	-	-	-	-	-	-	-	3 800 26 300		10,200	3 500 8 300		3,900	38,080	12	4,569	10,560	81	8,553	19	900	17,100	2 waste weirs.	800	45,122
			112,673				48,000			10,200			3,900			4,569			8,553			17,100		1,600	511,900 40

From the Seneca

PUDDLING.			PAVING.		
ards.	Price.	Amount.	Square yards.	Price.	Ar
	Cents.	*Dollars.*		*Dolls.*	*D*
	-	-	-	-	
	-	-	-	-	
	-	-	-	-	
	-	-	-	-	
	-	-	-	-	
	-	-	-	-	
	-	-	-	-	
	-	-	-	-	
	-	-	-	-	
,200	12	13,464	-	-	
		13,464			

SUBDIVISION 9.

Map sheet A, No. 6. Profile sheet A, No. 12.		EXCAVATION.						EMBANKMENT.						WALLING.					AQUEDUCTS.					LOCKS.			
Length of portion.	Distance from beginning of subdivision.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of stages.	Price.	Amount.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of stages.	Price.	Amount.	Distance in yards.	Reduced area.	Cubic yards.	Price.	Amount.	Length in yrds.	No. of arches.	Span of arches.	Height of piers.	Amount.	No.	Lift in feet.	Price.	A
						Cents.	Dollars.					Cents.	Dollars.				Dolls.	Dollars.			Feet.	Feet.	Dollars.			Dolls.	
Feeder	- -	2,420	8	19,360	-	14	2,710 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1,540	0 1,540	1,540	46	70,840	-	17	12,042 80	-	-	-	-	-	-	-	-	-	-	-	66	3	30	16	39,923	2	16	1,500	2
1,760	1 1,540	-	-	-	-	-	- -	1,760	58	102,080	-	20	20,416	1,760	10.7	18,812	3	56,436	-	-	-	-	-	1	8	1,500	
2,200	3 220	2,200	22.5	49,500	-	17	8,415 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3,080	4 1,540	880	58	51,040	-	17	8,676 80	2,200	40	88,000	-	20	17,600	2,200	8.	17,600	3	52,800	-	-	-	-	-	-	-	-	
1,320	5 1,100	1,320	22.5	30,200	-	17	5,134 00	-	-	-	-	-	-	-	-	-	-	-	36	1	30	-	12,700	-	-	-	
1,540	6 880	-	-	-	-	-	- -	-	-	-	-	-	-	1,540	16.	24,640	3	73,920	-	-	-	-	-	1	8	1,500	
2,640	8	2,640	58	153,120	-	17	26,030 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1,100	8 1,100	1,100	35	38,500	-	34	13,090 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Miscellaneous items of subdivision				-	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Yards.	Miles. Yards.	Miles. Yards.																									
15,180=	8 1,100	6 1,540		412,560			76,099 40	3,960		190,080			38,016	5,500		61,052		183,156	102				52,623	4			4

SUBDIVISION 9.

From the Seneca Creek to the head of the Great Falls.

	AQUEDUCTS.					LOCKS.				CULVERTS.			BRIDGES.			SUNDRIES.												
																PUDDLING.			PAVING.			FENCING.			SUNDRIES.			TOTAL.
Amount.	Length in yrds.	No. of arches.	Span of arches.	Height of piers.	Amount.	No.	Lift in feet.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	Cubic yards.	Price.	Amount.	Square yards.	Price.	Amount.	Distance.	Price.	Amount.		Amount.		
Dollars.			*Feet.*	*Feet.*	*Dollars.*			*Dolls.*	*Dollars.*		*Dolls.*	*Dollars.*		*Dollars.*	*Dollars.*		*Cents.*	*Dollars.*		*Dolls.*	*Dollars.*	*Miles.*	*Dolls.*	*Dollars.*		*Dollars.*	*Dollars.*	*Cts.*
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	dam - head gate	2,000 560	5,270	40
-	66	3	30	16	39,923	2	16	1,500	24,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	75 965	80
56.436	-	-	-	-	-	1	8	1,500	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	88,852	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	8,415	00
52,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	79.076	80
-	36	1	30	-	12,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	17.834	00
73,920	-	-	-	-	-	1	8	1,500	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	85,920	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	26.030	40
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	13.090	00
-	-	-	-	-	-	-	-	-	-	20	300	6,000	2 3	500 300	1,900	112,200	12	13,464	-	-	-	8½	900	7,650	1 waste weir	400	29,414	00
183,156	102				52,623	4			48,000			6,000			1,900			13,464						7,650		2,960	429,868	40

Map, Sheet A. Nos. 6 & 7. Profile, Sheet A. No. 12.			EXCAVATION.						EMBANKMENT.						WALLING.					AQUEDUCTS.						
Length of Portion.	Distance from beginning of subdivision.		Distance in Yards.	Reduced area. S. Y.	Cubic Yards.	No. of Stages.	Price.	Amount.	Distance in yards.	Reduced area. S. Y.	Cubic Yards.	No. of Stages.	Price.	Amount.	Distance in yards.	Reduced area. S. Y.	Cubic Yds.	Price.	Amount.	Length in yards.	No. of arches.	Span of arches.	Height of piers.	Amount.	No.	Lift in feet.
Yards.	*Miles.*	*Yards.*					*Dolls.*	*Dolls.*					*Cents.*	*Dolls.*				*Dolls.*	*Dolls.*			*Ft.*	*Ft.*	*Dolls.*		
Feeder	-	-	600	36	21,600	-	1 10	23,760 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
880	0	880	880	28.	24,640	-	1 10	27,104 00	-	-	-	-	-	-	100	40	4,000	3	12,000	-	-	-	-	-	-	-
200	0	1,080	200	35.	7,000	-	1 10	7,700 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
60	0	1,140	60	108.	6,480	-	1 65	10,692 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
150	0	1,290	-	-	-	-	-	-	150.	158.	23,700	3	42	9,954	150	68	9,450	5	47,250	-	-	-	-	-		
143	0	1,433	143	80.	11,400.40	-	1 10	12,584 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1,430	1	1,103	1,430	28.	40,040.	-	1 10	44,044 00	-	-	-	-	-	-	300	17	5,100	3	15,300	-	-	-	-	-	11	88
200	1	1,303	200	108.	21,600.	-	1 10	23,760 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
100	1	1,403	100	143.	14,300.	-	1 10	15,730 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
880	2	523	880	67.	59,160.	-	63	37,270 80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
440	2	963	440	22.5.	9,900.	-	17	1,683 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
220	2	1,183	-	-	-	-	-	-	220.	58.	12,760	-	20	2,552	220	16	3,520	3	10,560	-	-	-	-	-	-	-
1,200	3	623	1,200	92.	110,400.	-	34	37,536 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	8
400	3	1,023	400	22.5.	9,000.	-	17	1,530 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
880	4	143	-	-	-	-	-	-	880.	110.	96,800	-	20	19,360	880	24	21,120	3	63,360	-	-	-	-	-	-	-
1,760	5	143	1,760	67.	117,920.	-	34	40,092 80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	8
880	5	1,023	-	-	-	-	-	-	880.	20.	17,600	-	20	3,520	880	7	6,360	3	19,080	-	-	-	-	-	-	-
3,740	7	1,243	3,740	22.5.	84,150.	-	24	20,196 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	16
880	8	363	880	67.	58,960.	-	62	34,555 20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4,180	10	1,023	4,180	35.	146,300.	-	24	35,112 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	16.
			400	92.	36,800.	-	34	12,512 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,760	11	1,023	1,760	-	-	-	-	12,117 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	37.
Miscellaneous items of subdivision					-	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20,383=	11	1,023	*miles.* 10	*yds.* 1,653	779,650.40			397,978 80	2130.		150,860			35,386	2,530		49,550		167,550						22	173.

IVISION 10. From the Head of the Great Falls to Tide below the Little Falls.

AQUEDUCTS.				LOCKS.				CULVERTS			BRIDGES.			SUNDRIES.										TOTAL.	
No. of arches.	Span of arches.	Height of piers.	Amount.	No.	Lift in feet.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	PUDDLING.			PAVING.			FENCING.			SUNDRIES.			
														Cubic Yds.	Price.	Amount.	Sq. Yds.	Price.	Amount.	Distance in miles.	Price.	Amount.		Amount.	Dollars.	Cents.
Ft.	Ft.	Ft.	Dolls.			Dolls.	Dolls.		Dolls.	Dolls.		Dolls.	Dolls.		Cents.	Dolls.		Dolls.	Dolls.		Dolls.	Dolls.				
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Head Gate	800	24,560	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39,104	00
-	-	-	-								-	-	-	-	-	-	-	-	-	-	-	-	-	-	7,700	00
-	-	-	-								-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,692	00
-	-	-	-								-	-	-	-	-	-	-	-	-	-	-	-	-	-	57,204	00
-	-	-	-	11	88	1,500	132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	144,584	00
-	-	-	-								-	-	-	-	-	-	-	-	-	-	-	-	-	-	59,344	00
-	-	-	-								-	-	-	-	-	-	-	-	-	-	-	-	-	-	23,760	00
-	-	-	-								-	-	-	-	-	-	-	-	-	-	-	-	-	-	15,730	00
-	-	-	-								-	-	-	-	-	-	-	-	-	-	-	-	-	-	37,270	80
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,683	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13,112	00
-	-	-	-	1	8	1,500	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49,536	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,530	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	82,720	00
-	-	-	-	1	8	1,500	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52,092	80
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22,600	00
-	-	-	-	2	16	1,500	24,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44,196	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34,555	20
-	-	-	-	2	16.5	1,500	24,750	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	59,862	00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12,512	00
-	-	-	-	5	37.	1,500	55,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Head Gate to Feeder	800	68,417	00
-	-	-	-	-	-	-	-	16	300	4,800	1 / 5	500 / 300	2,000	117,810	12	14,136	-	-	-	11½	900	10,350	3 Waste Weirs and Gates.	3,600	34,886	00
				22	173.5		260.250			4,800			2,000			14,136						10,350		5,200	897,650	80

		EXCAVATION.						EMBANKMENT.						WALLING.					AQUEDUCTS.						
Length of portion.	Distance from beginning of subdivision.	Distance in yards.	Reduced area.	Cubic Yards.	No. of stages.	Price.	Amount.	Distance in yards.	Reduced area.	Cubic yards.	No. of stages.	Price.	Amount.	Distance in yards.	Reduced area.	Cubic yards.	Price.	Amount.	Length in yards.	No. of arches.	Span of arches.	Height of piers.	Amount.	No.	
Yards.	*Miles. Yds.*		*S. Y.*			*Dolls.*	*Dolls.*		*S. Y.*			*Dolls.*	*Dolls.*		*S. Y.*		*Dolls.*	*Dolls.*			ft.	ft.	*Dolls.*		
1,760	1	1,760	67	127,920	1	.17	21,746 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2,640	2 880	2,640	92	242,880	2	.34	82,579 20	880	58	46,400	-	.20	9,280	880	16	14,080	3	42,240	-	-	-	-	-	-	
Basin at	Georgetown	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Miscellaneous items		of subdivision		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		m. yds																							
4 440=	2 880	2 880		370,800			104,325 60	880		46,400			9,280	880				42,240							

SUBDIVISION 11. From below the Little Falls to Georgetown.

AQUEDUCTS.					LOCKS.				CULVERTS.			BRIDGES.			SUNDRIES.											TOTAL.
	No. of arches.	Span of arches.	Height of piers.	Amount.	No.	Lift in feet.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	PUDDLING.			PAVING.			FENCING.			SUNDRIES.		
															Cu. yds.	Price.	Amount.	Squ. yards.	Price.	Amount.	Distance.	Price.	Amount.		Amount.	Dollars.
		ft.	ft.	Dolls.			Dolls.	Dolls.		Dolls.			Dolls.	Dolls.		Dolls.	Dolls.		Dolls.	Dolls.	Miles.	Dolls.	Dolls.		Dolls.	
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21,746 40
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	134,099 20
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,842	10,842 00
	-	-	-	-	-	-	-	-	6	300	1,800	3 2	500 300	2,100	2,640	.17	448	-	-	-	2½	900	2,250	-	-	6,598 00
											1,800			2,100			448						2,250		10,842	173,285 60

River.

EET No. 5.

Cost $1 p cub. y	cubic yard.	T h	Total cost of masonry.		Total cost of tunnel.—$500 is added for fixing steam engine at each shaft.	
Dolls.	Cts.	Do	Dolls.	Cts.	Dolls.	Cts.
219.	53					
790.	53	1	37,206	09	48,555	75
790.	53	1	47,836	41	62,428	83
790.	53	1	47,836	41	62,428	83
790.	53	1	47,836	41	62,428	83
790.	53	1	47,836	41	62,428	83
790.	53	1	47,836	41	62,428	83
790.	53	1	47,836	41	62,428	83
790.	53	1	47,836	41	62,428	83
790.	53	1	47,836	41	62,428	83
790.	53	1	47,836	41	62,428	83
790.	53	1	47,836	41	62,428	83
790.	53	1	47,836	41	62,428	83
790.	53	2	47,836	41	62,428	83
790.	53	2	47,836	41	62,428	83
790.	53	2	47,836	41	62,428	83
790.	53	2	47,836	41	62,428	83
790.	53	2	47,836	41	63,146	49
790.	53	2	47,836	41	63,146	49
790.	53	2	47,836	41	63,146	49
790.	53	2	47,836	41	63,864	15
790.	53	2	47,836	41	63,864	15
790.	53	2	47,836	41	63,864	15
790.	53		47,836	41	63,864	15
790.	53		47,836	41	63,864	15
			[illegible]	41	63,864	15
					63,864	15

Detailed Estimate of a Tunnel through the Allegheny Ridge, 4 miles and 80 yards in length from the mou
Second supposition Slate ro

CHESAPEAKE AND OHIO CANAL.

	SHAFTS.														HEADING.																	
	EXCAVATION.					WALLING.					DRAINING.				EXCAVATION.										WALLING.							
	Length of shafts.	Area.	Cubic content.	Price per cu. yard.	Cost of excavation.	Area.	Cubic content.	Price per cub. yd.	Cost of walling.	Total cost of shafts.	Cost of pumps, &c. at $2 50 per foot depth.	Expense of steam engine at $4 per 12 h'rs.	Expense of 2 steam engines at $8 per 12 h'rs.	Total cost of draining shafts.	Heading from	Length of heading.	Area.	Cubic content.	Cost at $1 per cub. yd.	Shafts thro' which earth is raised.	Length of shaft.	Price for removing fr'm foot of shaft.	Cost of same.	Total cost of excavation of heading.	Length of heading.	Area of walls.	Cubic content.	Cost at $18 18 per cubic yard.	Total cost of heading.	Length of side heading	Area.	Cubic content.
	Feet.	Sq. Ft.	Cub. Yds.	Dolls.	Dolls. Cts.	Sq. Ft.	Cub. Yds.	Dolls.	Dolls. Cts.	Dolls. Cts.	Dolls. Cts.	Dolls.	Dolls.	Dolls. Cts.		Yds.	S. Y.	Cub. yds.	Dolls.		Feet.	Dolls.	Dolls Cts.	Dolls. Cts.	Yards.	S. yds.	Cu. yds.	Dolls. Cts.	Dolls. Cts.	Yd.	S. Y.	C. yd.
a	38	63.62	89.53	2 34	209 50	17.67	24.86	10 30	256 05	465 55	95	99.3	-	194 30	o to a	50	4.39	219.5	219.5	deep cut'ng.	35	1.34	294 13	513 63	50	2.38	119.	2,163 42	2,677 05	5	4.39	21.95
b	45	-	106.03	-	248 11	-	29.45	-	303 33	551 44	112 50	117.6	-	230 10	a b	180	-	790.2	790.2	a	38	-	1,058 87	1,849 07	180	-	428.40	7,788 31	9,637 38	-	-	-
n'	48	-	113.10	-	264 65	-	31.41	-	323 52	588 17	120	125.6	-	245 60	b c	-	-	-	790.2	b	45	-	1,058 87	1,849 07	-	-	-	-	9,637 38	-	-	-
c	49	-	115.45	-	270 15	-	32.06	-	330 21	600 36	122 50	128.3	-	250 80	c d	-	-	-	790.2	c	49	-	1,058 87	1,849 07	-	-	-	-	9,637 38	-	-	-
d	54	-	127.24	-	297 74	-	35.34	-	364 00	661 74	135	141.3	-	276 30	d e	-	-	-	790.2	d	54	-	1,058 87	1,849 07	-	-	-	-	9,637 38	-	-	-
e	64	-	150.80	-	352 87	-	41.88	-	431 36	784 23	160	167.6	-	327 60	e f	-	-	-	790.2	e	64	-	1,058 87	1,849 07	-	-	-	-	9,637 38	-	-	-
f	71	-	167.30	-	391 48	-	46.46	-	478 53	870 01	177 50	186.	-	363 50	f g	-	-	-	790.2	f	71	-	1,058 87	1,849 07	-	-	-	-	9,637 38	-	-	-
g	87	-	205.	-	479 70	-	56.93	-	586 37	1,066 07	217 50	227.6	-	445 10	g h	-	-	-	790.2	g	87	-	1,058 87	1,849 07	-	-	-	-	9,637 38	-	-	-
m'	93	-	219.13	-	512 76	-	60.86	-	626 85	1,139 61	232 50	243.3	-	475 80	h i	-	-	-	790.2	h	94	-	1,058 87	1,849 07	-	-	-	-	9,637 38	-	-	-
h	94	-	221.49	-	518 28	-	61.51	-	633 55	1,151 83	235	246.	-	481	i j	-	-	-	790.2	i	110	0.94	742 79	1,532 99	-	-	-	-	9,321 30	-	-	-
200	dollars,	first co	st of horse	gin, is	added to ea	ch of th	e following	prices, an	d brought in	the column	of total cost,	-	-	-	j k	-	-	-	790.2	j	129	-	742 79	1,532 99	-	-	-	-	9,321 30	-	-	-
i	110	-	259.19	1 93	500 23	-	71.98	-	741 39	1,441 62	275	288.	-	563	k l	-	-	-	790.2	k	173	-	742 79	1,532 99	-	-	-	-	9,321 30	-	-	-
j	129	-	303.96	-	586 64	-	84.42	-	869 52	1,656 16	322 50	337.6	-	660 10	l m	-	-	-	790.2	l	233	1.20	948 24	1,738 44	-	-	-	-	9,526 75	-	-	-
l	129	-	303.96	-	586 64	-	84.42	-	869 52	1,656 16	322 50	337.6	-	660 10	m n	-	-	-	790.2	m	287	-	948 24	1,738 44	-	-	-	-	9,526 75	-	-	-
k	173	-	407.63	-	786 72	-	113.21	-	1,166 06	2,152 78	432 50	453.	-	885 50	n o	-	-	-	790.2	n	349	-	948 24	1,738 44	-	-	-	-	9,526 75	-	-	-
k'	173	-	407.63	-	786 72	-	113.21	-	1,166 06	2,152 78	432 50	453.	-	885 50	o p	-	-	-	790.2	o	421	1.72	1,359 14	2,149 34	-	-	-	-	9,937 65	-	-	-
l	233	-	549.01	2 20	1,207 82	-	152.48	-	1,570 54	2,978 72	592 50	610.	-	1,202 50	p q	-	-	-	790.2	p	473	-	1,359 14	2,149 34	-	-	-	-	9,937 65	-	-	-
j'	275	-	647.98	-	1,425 55	-	179.97	-	1,853 69	3,479 24	687 50	720.	-	1,407 50	q r	-	-	-	790.2	q	510	-	1,359 14	2,149 34	-	-	-	-	9,937 65	-	-	-
m	287	-	676.25	-	1,487 75	-	187.82	-	1,934 54	3,622 29	717 50	751.3	-	1,468 80	r s	-	-	-	790.2	r	551	-	1,359 14	2,149 34	-	-	-	-	9,937 65	-	-	-
n	349	-	822.35	-	1,809 17	-	228.40	-	2,352 52	4,361 69	872 50	913.6	-	1,786 10	s t	-	-	-	790.2	s	603	1.57	1,240 61	2,030 81	-	-	-	-	9,819 12	-	-	-
i'	400	-	942.52	-	2,073 54	-	261.77	-	2,696 23	4,969 77	1,000	1,047.	-	2,047	t u	-	-	-	790.2	t	675	-	1,240 61	2,030 81	-	-	-	-	9,819 12	-	-	-
250	dollars,	first co	st of horse	gin (4	horse powe	r,) is ad	ded to each	of the fol	lowing pric	es, and brou	ght in the	column of	total cost,	-	u v	[illegible]	-	-	790.2	u	754	-	1,240 61	2,030 81	-	-	-	-	9,819 12	-	-	-
o	421	-	992.	2 72	2,698 24	-	275.52	-	2,837 85	5,786 09	1,052 50	1,102.3	2,204.6	3,257 10	w [illegible]	[illegible]	-	-	790.2	w	847	-	1,240 61	2,030 81	-	-	-	-	9,819 12	-	-	-
p	473	-	1,114.53	-	3,031 52	-	309.55	-	3,188 36	6,469 88	1,182 50	1,235.	2,470.	3,652 50	x [illegible]	[illegible]	-	-	790.2	x	816	-	1,240 61	2,030 81	-	-	-	-	9,819 12	-	-	-
q	510	-	1,201.71	-	3,268 65	-	333.76	-	3,437 72	6,956 37	1,270	1,335.3	2,670.6	3,940 60	y [illegible]	[illegible]	-	-	790.2	y	801	-	1,240 61	2,030 81	-	-	-	-	9,819 12	-	-	-
k'	510	-	1,201.71	-	3,268 65	-	333.76	-	3,437 72	6,956 37	1,270	1,335.3	2,670.6	3,940 60	z y	[illegible]	-	-	790.2	z	781	-	1,240 61	2,030 81	-	-	-	-	9,819 12	-	-	-
r	551	-	1,298.32	-	3,531 43	-	360.59	-	3,714 07	7,495 50	1,377 50	1,442.6	2,885.2	4,262 70	a' z	-	-	-	790.2	a'	760	-	1,240 61	2,030 81	-	-	-	-	9,819 12	-	-	-
$500	expen	ses of	moving and	setting	up steam en	gine is	added to ea	ch of the							b' a'	-	-	[illegible]	790.2	b'	741	-	1,240 61	2,030 81	-	-	-	-	9,819 12	-	-	-
fol	lowing	prices,	and broug	ht into	the column	of tot	al cost.	First cost	-	14,000					c' b'	-	-	[illegible]	790.2	c'	730	-	1,240 61	2,030 81	-	-	-	-	9,819 12	-	-	-
of	steame	ngines,	including	machin	ery to appl	y it, at	$3,500 each,	for 4,							d' c'	-	-	[illegible]	790.2	d'	711	-	1,240 61	2.030 81	-	-	-	-	9,819 12	-	-	-
s	603	-	1,420.85	2 57	3,651 58	-	394.63	-	4,064 68	8,216 26	1,507 50	1,578.6	3,157.2	4,664 70	e' d'	-	-	[illegible]	790.2	e'	700	-	1,240 61	2,030 81	-	-	-	-	9,819 12	-	-	-
g'	612	-	1,442.06	-	3,706 09	-	400.52	-	4,125 35	8,351 44	1,530	1,602.3	3,204.6	4,734 60	f' e'	-	-	[illegible]	790.2	f'	682	-	1,240 61	2,030 81	-	-	-	-	9,819 12	-	-	-
t	675	-	1,590.50	-	4,087 58	-	441.75	-	4,550 02	9,137 60	1,687 50	1,767.3	3,534.6	5,222 10	g' f'	-	-	[illegible]	790.2	g'	612	-	1,240 61	2,030 81	-	-	-	-	9,819 12	-	-	-
f'	682	-	1,607.00	-	4,129 99	-	446.33	-	4,597 19	9,227 18	1,705	1,785.6	3,571.2	5,276 20	h' g'	-	-	-	790.2	h'	510	1.72	1,359 14	2,149 34	-	-	-	-	9,937 65	-	-	-
e'	700	-	1,6'9.41	-	4,238 98	-	458.11	-	4,718 53	9,457 51	1,750	1,832.6	3,665.2	5,415 20	i' h'	-	-	-	790.2	i'	400	-	1,359 14	2,149 34	-	-	-	-	9,937 65	-	-	-
d'	711	-	1,675.33	-	4,305 59	-	465.31	-	4,792 69	9,598 28	1,777 50	1,861.3	3,722.6	5,500 10	j' i'	-	-	-	790.2	j'	275	1.20	948 24	1,738 44	-	-	-	-	9,526 75	-	-	-
c'	730	-	1,720.10	-	4,420 65	-	477.74	-	4,920 72	9,841 37	1,825	1,911.	3,822.	5,647	k' j'	-	-	-	790.2	k'	173	0.94	742 79	1,532 99	-	-	-	-	9,321 30	-	-	-
b'	741	-	1,746.02	-	4,487 27	-	484.94	-	4,994 88	9,982 15	1,852 50	1,940.	3,880.	5,722 50	l' k'	-	-	-	790.2	l'	129	-	742 79	1,532 99	-	-	-	-	9,321 30	-	-	-
u	754	-	1,776.65	-	4,565 99	-	493.45	-	5,082 53	10,148 52	1,885	1,974.	3,948.	5,833	m' l'	-	-	-	790.2	m'	93	1.34	1,058 87	1,849 07	-	-	-	-	9,637 38	-	-	
a'	760	-	1,790.79	-	4,602 33	-	497.37	-	5,122 91	10,225 24	1,900	1,989.6	3,979.2	5,879 20	n' m'	180	-	-	790.2	n'	48	-	1,058 87	1,849 07	-	-	-	-	9,637 38	-	-	
z	781	-	1,840.27	-	4,729 49	-	511.12	-	5,264 53	10,494 02	1,952 50	2,044.6	4,089.2	6,041 70	o' n'	50	-	219.5	219.5	deep cut'ng.	35	1.34	2,294 13	513 63	50	2.38	119.	2,163 42	2,677 05	-	-	
y	801	-	1,887.40	-	4,840 61	-	524.21	-	5,399 36	10,739 97	2,002 50	2,097.	4,194.	6,196 50																		
x	816	-	1,922.74	-	4,941 44	-	534.02	-	5,500 40	10,941 84	2,040	2,136.3	4,272.6	6,312 60																		
v	847	-	1,995.79	-	5,129 18	-	554.31	-	5,709 39	11,338 57	2,117 50	2,217.3	4,434.6	6,552 10																		
w	847	-	1,995.79	-	5,129 18	-	554.31	-	5,709 39	11,338 57	2,117 50	2,217.3	4,434.6	6,552 10																		
			38,704.53		97,564 95		10,749.75		110,722 00	233,032 95	8 steam engines, 10 horse power, at 5,000 each, - -			119,469 30 40,000 159,469 30				31,256.8	31,256.8				44,147 25	75,464 05			16,945.60	308,071 91	383,534 98			856.05

from the mouth of Bowman's Run, a branch of Wills' Creek, to the mouth of Flaugherty Creek, a branch of Casselman's River.

sition Slate rock and Sand stone.

SHEET No. 5.

	SIDE HEADING.													TUNNEL.																
	EXCAVATION.									WALLING.				EXCAVATION.									MASONRY.							
Total cost of heading	Length of side heading	Area.	Cubic content.	Cost at $1 per yard.	Shafts thro' which earth is raised.	Length of shafts.	Price for removing fr'm foot of shaft.	Cost of same.	Total cost of excavation of side heading.	Area of walls.	Cubic content.	Cost at $18 18 per cubic yard.	Total cost of side heading.	Length of tunnel.	Area.	Cubic content.	Cost at $1 per cubic yard.	Shafts thro' which earth is raised.	Length of shafts.	Price for removing from foot of shafts.	Cost of same.	Total cost of excavation.	Length of tunnel.	Area.	Cubic content of masonry requiring common mortar, the area being 10.47 squa. yards.	Cost at $11.86 per cubic yard.	Cubic content of masonry requiring water lime mortar, the area being 9.56 square yards.	Cost at $14.81 per cubic yard.	Total cost of masonry.	Total cost of tunnel.—$500 is added for fixing steam engine at each shaft.
Dolls. Cts.	*Yds.*	*S. Y.*	*C. yds.*	*Ds. Cts.*		*Feet.*	*Dolls.*	*Dls. Cts.*	*Dls. Cts.*	*S. Y.*	*Cu. yards.*	*Dls. Cts.*	*Dolls. Cts.*	*Yds.*	*S. Y.*	*Cubic yards.*	*Dolls. Cts.*		*Feet.*	*Dolls.*	*Dolls. Cts.*	*Dolls. Cts.*	*Yds.*	*S. Y.*	*Cubic yards.*	*Dolls. Cts.*	*Cubic yards.*	*Dolls. Cts.*	*Dolls. Cts.*	*Dolls. Cts.*
2,677 05	5	4.39	21.95	21 95	*a*	38	1.34	29 41	51 36	1.50	7.95	144 53	195 89	140	66.45	9,303.00	9,303 00	*a*	38	0.22	2,046 66	11,349 66	140	20.03	1,465 80	17,384 39	1,338 40	19,821 70	37,206 09	48,555 75
9,637 38	-	-	-	-	*b*	45	-	29 41	51 36	-	-	144 53	195 89	180	-	11,961.00	11,961 00	*b*	45	-	2,631 42	14,592 42	180	-	1,864 60	22,351 36	1,720 80	25,485 05	47,836 41	62,428 83
9,637 38	-	-	-	-	*c*	49	-	29 41	51 36	-	-	144 53	195 89	-	-	-	-	*c*	49	-	2,631 42	14,592 42	-	-	-	22,351 36	-	25,485 05	47,836 41	62,428 83
9,637 38	-	-	-	-	*d*	54	-	29 41	51 36	-	-	144 53	195 89	-	-	-	-	*d*	54	-	2,631 42	14,592 42	-	-	-	22,351 36	-	25,485 05	47,836 41	62,428 83
9,637 38	-	-	-	-	*e*	64	-	29 41	51 36	-	-	144 53	195 89	-	-	-	-	*e*	64	-	2,631 42	14,592 42	-	-	-	22,351 36	-	25,485 05	47,836 41	62,428 83
9,637 38	-	-	-	-	*f*	71	-	29 41	51 36	-	-	144 53	195 89	-	-	-	-	*f*	71	-	2,631 42	14,592 42	-	-	-	22,351 36	-	25,485 05	47,836 41	62,428 83
9,637 38	-	-	-	-	*g*	87	-	29 41	51 36	-	-	144 53	195 89	-	-	-	-	*g*	87	-	2,631 42	14,592 42	-	-	-	22,351 36	-	25,485 05	47,836 41	62,428 83
9,637 38	-	-	-	-	*h*	94	-	29 41	51 36	-	-	144 53	195 89	-	-	-	-	*h*	94	-	2,631 42	14,592 42	-	-	-	22,351 36	-	25,485 05	47,836 41	62,428 83
9,637 38	-	-	-	-	*i*	110	0.94	20 63	42 58	-	-	144 53	187 11	-	-	-	-	*i*	110	-	2,631 42	14,592 42	-	-	-	22,351 36	-	25,485 05	47,836 41	62,428 83
9,321 30	-	-	-	-	*j*	129	-	20 63	42 58	-	-	144 53	187 11	-	-	-	-	*j*	129	-	2,631 42	14,592 42	-	-	-	22,351 36	-	25,485 05	47,836 41	62,428 83
9,321 30	-	-	-	-	*k*	173	-	20 63	42 58	-	-	144 53	187 11	-	-	-	-	*k*	173	-	2,631 42	14,592 42	-	-	-	22,351 36	-	25,485 05	47,836 41	62,428 83
9,321 30	-	-	-	-	*l*	233	1.20	26 34	48 29	-	-	144 53	192 82	-	-	-	-	*l*	233	-	2,631 42	14,592 42	-	-	-	22,351 36	-	25,485 05	47,836 41	62,428 83
9,526 75	-	-	-	-	*m*	287	-	26 34	48 29	-	-	144 53	192 82	-	-	-	-	*m*	287	-	2,631 42	14,592 42	-	-	-	22,351 36	-	25,485 05	47,836 41	62,428 83
9,526 75	-	-	-	-	*n*	349	-	26 34	48 29	-	-	144 53	192 82	-	-	-	-	*n*	349	-	2,631 42	14,592 42	-	-	-	22,351 36	-	25,485 05	47,836 41	62,428 83
9,526 75	-	-	-	-	*o*	421	1.72	37 75	59 70	-	-	144 53	204 23	-	-	-	-	*o*	421	0.28	3,349 08	15,310 08	-	-	-	22,351 36	-	25,485 05	47,836 41	63,146 49
9,937 65	-	-	-	-	*p*	473	-	37 75	59 70	-	-	144 53	204 23	-	-	-	-	*p*	473	-	3,349 08	15,310 08	-	-	-	22,351 36	-	25,485 05	47,836 41	63,146 49
9,937 65	-	-	-	-	*q*	510	-	37 75	59 70	-	-	144 53	204 23	-	-	-	-	*q*	510	-	3,349 08	15,310 08	-	-	-	22,351 36	-	25,485 05	47,836 41	63,146 49
9,937 65	-	-	-	-	*r*	551	-	37 75	59 70	-	-	144 53	204 23	-	-	-	-	*r*	551	-	3,349 08	15,310 08	-	-	-	22,351 36	-	25,485 05	47,836 41	63,146 49
9,937 65	-	-	-	-	*s*	603	1.57	34 46	56 41	-	-	144 53	200 94	-	-	-	-	*s*	603	0.34	4,066 74	16,027 74	-	-	-	22,351 36	-	25,485 05	47,836 41	63,864 15
9,819 12	-	-	-	-	*t*	675	-	34 46	56 41	-	-	144 53	200 94	-	-	-	-	*t*	675	-	4,066 74	16,027 74	-	-	-	22,351 36	-	25,485 05	47,836 41	63,864 15
9,819 12	-	-	-	-	*u*	754	-	34 46	56 41	-	-	144 53	200 94	-	-	-	-	*u*	754	-	4,066 74	16,027 74	-	-	-	22,351 36	-	25,485 05	47,836 41	63,864 15
9,819 12	-	-	-	-	*w*	847	-	34 46	56 41	-	-	144 53	200 94	-	-	-	-	*v*	847	-	4,066 74	16,027 74	-	-	-	22,351 36	-	25,485 05	47,836 41	63,864 15
9,819 12	-	-	-	-	*x*	816	-	34 46	56 41	-	-	144 53	200 94	-	-	-	-	*w*	847	-	4,066 74	16,027 74	-	-	-	22,351 36	-	25,485 05	47,836 41	63,864 15
9,819 12	-	-	-	-	*y*	801	-	34 46	56 41	-	-	144 53	200 94	-	-	-	-	*x*	816	-	4,066 74	16,027 74	-	-	-	22,351 36	-	25,485 05	47,836 41	63,864 15
9,819 12	-	-	-	-	*z*	781	-	34 46	56 41	-	-	144 53	200 94	-	-	-	-	*y*	801	-	4,066 74	16,027 74	-	-	-	22,351 36	-	25,485 05	47,836 41	63,864 15
9,819 12	-	-	-	-	*a'*	760	-	34 46	56 41	-	-	144 53	200 94	-	-	-	-	*z*	781	-	4,066 74	16,027 74	-	-	-	22,351 36	-	25,485 05	47,836 41	63,864 15
9,819 12	-	-	-	-	*b'*	741	-	34 46	56 41	-	-	144 53	200 94	-	-	-	-	*a'*	760	-	4,066 74	16,027 74	-	-	-	22,351 36	-	25,485 05	47,836 41	63,864 15
9,819 12	-	-	-	-	*c'*	730	-	34 46	56 41	-	-	144 53	200 94	-	-	-	-	*b'*	741	-	4,066 74	16,027 74	-	-	-	22,351 36	-	25,485 05	47,836 41	63,864 15
9,819 12	-	-	-	-	*d'*	711	-	34 46	56 41	-	-	144 53	200 94	-	-	-	-	*c'*	730	-	4,066 74	16,027 74	-	-	-	22,351 36	-	25,485 05	47,836 41	63,864 15
9,819 12	-	-	-	-	*e'*	700	-	34 46	56 41	-	-	144 53	200 94	-	-	-	-	*d'*	711	-	4,066 74	16,027 74	-	-	-	22,351 36	-	25,485 05	47,836 41	63,864 15
9,819 12	-	-	-	-	*f'*	682	-	34 46	56 41	-	-	144 53	200 94	-	-	-	-	*e'*	700	-	4,066 74	16,027 74	-	-	-	22,351 36	-	25,485 05	47,836 41	63,864 15
9,819 12	-	-	-	-	*g'*	612	-	34 46	56 41	-	-	144 53	200 94	-	-	-	-	*f'*	682	-	4,066 74	16,027 74	-	-	-	22,551 36	-	25,485 05	47,836 41	63,864 15
9,937 65	-	-	-	-	*h'*	510	1.72	37 75	59 70	-	-	144 53	204 23	-	-	-	-	*g'*	612	-	4,066 74	16,027 74	-	-	-	22,351 36	-	25,485 05	47,836 41	63,864 15
9,937 65	-	-	-	-	*i'*	400	-	37 75	59 70	-	-	144 53	204 23	-	-	-	-	*h'*	510	0.28	3,349 08	15,310 08	-	-	-	22,351 36	-	25,485 05	47,836 41	63,146 49
9,526 75	-	-	-	-	*j'*	275	1.20	26 34	48 29	-	-	144 53	192 82	-	-	-	-	*i'*	400	-	3,349 08	15,310 08	-	-	-	22,351 36	-	25,485 05	47,836 41	63,146 49
9,321 30	-	-	-	-	*k'*	173	0.94	20 63	42 58	-	-	144 53	187 11	-	-	-	-	*j'*	275	0.22	2,631 42	14,592 42	-	-	-	22,351 36	-	25,485 05	47,836 41	62,428 83
9,321 30	-	-	-	-	*l'*	129	-	20 63	42 58	-	-	144 53	187 11	-	-	-	-	*k'*	173	-	2,631 42	14,592 42	-	-	-	22,351 36	-	25,485 05	47,836 41	62,428 83
9,637 38	-	-			*m'*	93	1.34	29 41	51 36	-	-	144 53	195 89	-	-	-	-	*l'*	129	-	2,631 42	14,592 42	-	-	-	22,351 36	-	25,485 05	47,836 41	62,428 83
9,637 38	-	-			*n'*	48	-	29 41	51 36	-	-	144 53	195 89	140	66.45	-	-	*m'*	93	-	2,631 42	14,592 42	-	-	-	22,351 36	-	25,485 05	47,836 41	62,428 83
2,577 05	-	-														9,303.00	9,303 00	*n'*	48	0.22	2,046 66	11,349 66	140	-	1,46[illegible] 80	17,384 39	1,33[illegible]	19,821 70	37,206 09	48,555 75
[illegible]5,534 98			856.05	856 05				1,211 55	2,067 60		3,102.05	5,636 67	7,704 27			473,923.00	473,124 00				129,923 04	603,047 04			74,546 40	884,120 46	68,067 20	1,008,075 30	1,892,195 76	2,495,242 80

Chesapeake and Ohio Canal—Middle Section, Eastern Portion.

Map sheet M, No. 5. Profile same.		EXCAVATION.						EMBANKMENT.						WALLING.					AQUEDUCTS.						
Length of portion.	Distance from beginning of subdivision.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of stages.	Price. Dolls.	Amount. Dollars.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of stages.	Price. Dolls.	Amount. Dollars.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	Price. Dollars.	Amount. Dollars.	Length in yards.	No. of arches.	Span of arches. feet	Height of piers. feet	Amount. Dollars.	No.	Lift in feet.
Deep cutting	Summit level 140	140	82.6	11,564	.	1.62	18,733 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Basin -	880	.	.	.	.	.	.	80	720	57,600	.	0.20	11,520 00	20	75.68	1,513.6	4 00	6,054 40	.	.	.	.	.	.	.
	-	-	.	.	.	.	.	100	200	20,000	.	.20	4,000 00	.	.	.	.	.	.	.	.	.	.	.	.
660	1,540	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2,400 00	7	56
3,630	2 1,650	3,630	34.81	84,240	.	.625	52,650 00	.	.	.	.	.	.	.	.	.	.	.	.	1	30	15	15,284 75	15	120
			.	42,120	.	.22	9,266 40	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
550	3 340	550	24 6	13,530	.	.20	2,706 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	16
		550	34.81	19 145	.	.625	11,975 94	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dam & feeder	8 660	.	17.	7,480	.	.22	1,645 60	.	.	.	.	.	.	40	6.38	255.20	4 00	1,020 80	.	.	.	.	.	.	.
330	3 670	330	58.41	19,275	.	.18	3,469 55	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	8
		330	83.22	27,463	.	.625	17,164 37	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
770	3 1,440	770	12.31	9,478	.	.22	2,074 16	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	24
		770	22.5	17,325	.	.62	10 741 50	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
550	4 230	550	48.77	26,823	.	.22	5,901 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	24
		550	101.63	55,896	.	.62	34,655 52	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dam & feeder	5 1,650	.	17.	6,860	.	.22	1,496 00	.	.	.	.	.	.	50	6.38	319	4 00	1,276 00	.	.	.	.	.	.	.
4,950	6 1,660	4,950	10.	49 500	.	.22	16,990 00	.	.	.	.	.	.	350	6.38	2,233	1 40	3,126 20	.	.	.	.	.	17	136
		4,950	12.5	51,875	.	.62	32,162 50	.	.	.	.	.	.	300	12.	3,600	1 40	5,040 00	.	.	.	.	.	.	.
330	7 230	330	23.6	7,788	.	.22	1,713 36	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	8
		330	34 81	11,487	.	.62	7,121 94	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1,870	8 340	1,870	12.31	23,019	.	.22	5,064 18	.	.	.	.	.	.	.	.	.	.	.	.	1	30	15	15,284 75	8	64
		1,870	22.5	42,075	.	.62	26,086 50	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
80	8 420	.	.	.	.	.	.	40	162	6,480	.	.20	1,296 00	.	.	.	.	.	40	2	30	15	31,503 00	.	.
1,320	8 1,740	1,320	12.31	16,249	.	.22	3,574 78	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6	48
		1,320	22.5	29,700	.	.62	18,414 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
440	9 420	.	.	.	.	.	.	440	58	25,520	.	1.12	28,582 40	440	31.03	13,653	3 00	40.959 00	.	.	.	.	.	2	16
Dam & feeder	9 440	.	8.	1,600	.	.62	992 00	.	.	.	.	.	.	27	6.38	172	4 00	689 00	.	.	.	.	.	.	.
								440	152	66,880	.	.25	16,720 00	.	.	.	.	.	.	.	.	.	.	.	.
1,760	10 420	1,760	12.31	21,665	.	.22	4,766 30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	64
		1,760	22.5	39,600	.	.62	24,552 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
40	10 460	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	40	2	30	15	31,503 00	.	.
880	10 1,340	880	43.22	38,033	.	.22	8,367 26	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	40
		880	58.41	51,400	.	.62	31,868 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dam & feeder	11 880	.	14.	4,200	.	.37	1,554 00	.	.	.	.	.	.	38	14.	532	4 00	2,128 00	.	.	.	.	.	.	.
1,760	11 1,340	1,760	20.	35,200	.	.63	22,176 00	.	.	.	.	.	.	1,760	6.5	11,440	1 40	16,016 00	.	.	.	.	.	9	72
1,100	12 680	1,100	31.5	34,650	.	.63	21,829 50	.	.	.	.	.	.	1,100	10.04	11,440	1 40	16,016 00	.	.	.	.	.	7	56
660	12 1,340	660	23.6	15,576	.	.24	3,738 24	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	32
		660	34.81	22,974	.	.62	14,243 88	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11	88
1,760	13 1,340	1,760	12 31	21,665	.	.22	4,766 30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		1,760	22.5	39,600	.	.62	24,552 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
180	13 1,520	.	.	.	.	.	.	140	120	16,800	.	.20	3,360 00	.	.	.	.	.	40	2	30	15	31,503 00	.	.
3,340	15 1,340	3,340	12 31	41,115	.	.20	8,223 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	18	144
		3,340	22.5	75,150	.	.62	46 593 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	15 1,340						501.827 78						65,478 40					92.325 40					127,478 50		

SUBDIVISION 1.

From the Eastern end of the Tunnel to the mouth of Little Wills' Creek.

	AQUEDUCTS.					LOCKS.				CULVERTS.			BRIDGES.			SUNDRIES.										TOTAL.
																PUDDLING.			PAVING.			PENCING.			SUNDRIES.		
unt.	Length in yards.	No. of arches.	Span of arches.	Height of piers.	Amount.	No.	Lift in feet.	Price.	Amount.	No.	Price.	Amount.	No	Price.	Amount.	Cubic yards.	Price	Amount.	Square yards.	Price.	Amount.	Distance in miles.	Price.	Amount.		Amount.	
ars.			feet	feet	Dollars.			Dollars.	Dollars.		Dolls.	Dollars.		Dolls.	Dollars.		Dolls.	Dollars.		Dolls.	Dollars.		Dolls.	Dollars.		Dollars.	Dollars. Cts.
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	18,733 00
4 40	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3,440	.25	860 00	4,654	.81	3,769 74	.	.	.	.	.	22,204 14
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2,150	.25	537 00	.	.	.	.	.	.	.	.	4,537 00
	.	.	.	.	2,400 00	7	56	1,500	89.000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	91,400 00
	.	1	30	15	15,284 75	15	120	1,500	180,000	3	300	900	.	.	.	.	.	.	.	.	.	.	.	.	.	.	248,834 75
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	9,266 40
	.	.	.	.	.	2	16	1,500	24,000	1	.	300	.	.	.	.	.	.	.	.	.	.	.	.	.	.	27,006 00
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11,975 94
0 80	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	gate & waste weir	600	3,266 40
	.	.	.	.	.	1	8	1,500	12.000	1	.	300	.	.	.	.	.	.	.	.	.	.	.	.	.	.	15,769 55
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	17,164 37
	.	.	.	.	.	3	24	1,500	36,000	1	.	300	.	.	.	.	.	.	.	.	.	.	.	.	.	.	38.374 16
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10,741 50
	.	.	.	.	.	3	24	1,500	36,000	1	.	300	.	.	.	.	.	.	.	.	.	.	.	.	.	.	42.201 00
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	34,655 52
6 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	gate & waste weir	600	3,372 00
6 20	.	.	.	.	.	17	136	1,500	204,000	4	300	1,200	.	.	.	.	.	.	.	.	.	.	.	.	.	.	225,316 20
0 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	37,202 50
	.	.	.	.	.	1	8	.	12,000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	13,713 36
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7,121 94
	.	1	30	15	15,284 75	8	64	1,500	96.000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	116.348 93
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	26,086 50
	40	2	30	15	31,503 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	32,799 00
	.	.	.	.	.	6	48	1,500	72.000	1	.	300	.	.	.	.	.	.	.	.	.	.	.	.	.	.	75,874 78
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	18,414 00
9 00	.	.	.	.	.	2	16	1,500	24.000	.	.	.	.	.	.	7,480	.12	897 60	.	.	.	.	.	.	.	.	94,439 00
9 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	gate & waste weir	600	2.281 00
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	16,720 00
	.	.	.	.	.	8	64	1,500	96.000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	100,766 30
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	24,552 00
	40	2	30	15	31,503 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	31,503 00
	.	.	.	.	.	5	40	1,500	60.000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	68,367 26
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	31,868 00
8 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	gate & waste weir	600	4.282 00
6 00	.	.	.	.	.	9	72	1,500	108.000	2	300	600	.	.	.	29.920	.12	3,590 00	.	.	.	.	.	.	.	.	150,382 00
6 00	.	.	.	.	.	7	56	1,500	89.000	.	.	.	.	.	.	18,700	.12	2,244 00	.	.	.	.	.	.	.	.	129.089 50
	.	.	.	.	.	4	32	1,500	48.000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	51,738 24
	.	.	.	.	.	11	88	1,500	132.000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	146,248 88
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4,766 80
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	24,552 00
	40	2	30	15	31,503 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	34.863 00
	.	.	.	.	.	18	144	1,500	216.000	1	.	2,400	.	.	.	.	.	.	.	.	.	.	.	.	.	.	226.623 00
	.	.	.	.	.	.	.	.	.	.	.	.	3	300	900	.	.	.	.	.	.	.	.	.	.	.	47.493 00
													1	500	500	.	.	.	.	.	.	3¼	900	2,925	.	.	3.425 00
25 40					127,478 50				1,534,000			6,600			1,400			8,128 60			3,769 74			2,925		2,400	2,346,333 42

Basin and Deep Cut excluded $ 2,300,859 28

CHESAPEAKE AND OHIO CANAL—MIDDLE SECTION, EASTERN PORTION.

Subdivision 2.

Map sheet M, No. 6.
Profile, same.

Length of portion.	Distance from beginning of subdivision.	EXCAVATION. Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of stages.	Price.	Amount.	EMBANKMENT. Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of stages.	Price.	Amount.	WALLING. Distance in yards.	Reduced area. S. Y.	Cubic yards.	Price.	Amount.	AQUEDUCTS. Length in yards.	No. of arches.	Span of arches.	Height of piers.	Amount.	LOCKS. No.	Lift in feet.	Price.
						Cents.	Dollars.					Cents.	Dollars.				Dolls.	Dollars.			Feet.	Feet.	Dollars.			Dollars.
Dam & feeder	-	4-0	17	7,480	1	37	2,767 60	620	60	37,200	2	30	11,160	30	15.5	465	4	1,860	-	-	-	-	-	-	-	-
1.860	1 100	1.860	10	18.600	-	20	3.720	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1.860	12.5	23.250	-	62	14.415	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	48	1.500
1.220	1 1.320	1,220	25.2	30 744	1	62	19.061 28	-	-	-	-	-	-	1,220	8.1	9.882	1 50	14,823	-	-	-	-	-	2	16	-
220	1 1.540	220	20	4.400	-	68	2,992	-	-	-	-	-	-	220	6.5	1.430	1 40	2,002	-	-	-	-	-	1	8	-
1,200	2 980	1.200	12 31	14.772	-	22	3.249 84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1 200	22.5	27,000	-	62	16.740	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	32	-
660	2 1.640	-	-	-	-	-	-	660	40	26,400	-	20	5,280	660	10.7	7,062	4	28,248	-	-	-	-	-	-	-	-
2,080	4 200	2.080	12.31	25 604	-	22	5.632 88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2 080	22.5	46 800	-	60	28.080	-	-	-	-	-	-	-	-	-	-	-	-	1	30	15	15,284	6	48	-
Dam & feeder	-	400	17	6,800	-	22	1.496	-	-	-	-	-	-	130	10.69	427	4	1,710	-	-	-	-	-	-	-	-
440	4 640	-	-	-	-	-	-	440	58.17	25,594	1	20	5,118 80	440	16.04	7,057	4	28.228	-	-	-	-	-	-	-	-
3.300	6 420	3 300	12.31	40 623	-	17	6,906	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		3 300	22 5	74,250	-	75	55,687 50	-	-	-	-	-	-	-	-	-	-	-	-	1	60	12	16,320	5	40	-
Dam & feeder	-	600	17	10 200	-	32	3,264	300	120	36,000	-	22	7,920	100	16.04	1,604	4	6,416	-	-	-	-	-	-	-	-
300	6 720	300	15 3	4,590	-	68	3,141	-	-	-	-	-	-	300	4.8	1,440	4	5,760	-	-	-	-	-	1	8	-
6,960	10 640	6,960	12.31	85 677	-	20	17,135 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		6,960	22.5	156 600	-	62	97,092	-	-	-	-	-	-	-	-	-	-	-	-	1	30	15	15,000	7	56	-
Dam & feeder	-	600	17	10,200	-	32	3,264	300	120	36,000	-	22	7,920	100	16.04	1,604	4	6,416	-	-	-	-	-	-	-	-
1,320	11 200	1,320	12.31	16,249	-	22	3.574 78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1,320	22.5	29 700	-	62	18.414	-	-	-	-	-	-	-	-	-	-	-	-	3	30	15	40,572	2	16	-
1.980	12 420	1 980	59.6	118.008	-	98	115,648	1,980	13	35,640	-	40	14,256	1,980	23 3	16.184	1 40	64,587	-	-	-	-	-	-	-	-
Dam & feeder	-	200	8	1,600	-	62	992	-	-	-	-	-	-	38	8	464	4	1,856	-	-	-	-	-	2	16	-
2.880	13 1.540	2.880	58.4	168,192	-	22	37,002 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	21	-
Basin.	-	-	-	39.000	-	17	6,630	-	-	-	-	-	-	-	-	1.400	4	5,600	-	-	-	-	-	5	36	-
Miscellaneous items of subdivision		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							466,905 52						51,654 80					167.506					87,176			
FEEDER FROM THE POTOMAC: 1st pass, levee, guard-locks, and aqueduct over Willis' creek.		2.940	9	26 460	-	62	16.405 20	120	105	12,600	-	20	2.520	130	-	5,345	4	21,380	-	-	-	-	-	-	Guard	-
		2 940	5	14.700	-	62	9,114	4.400	32	140.800	-	20	28,160	-	-	-	-	-	-	-	-	-	-	-	-	-
		3.660	6	21.960	-	62	13 615 20	1.980	13	25,740	-	20	5,148	-	-	-	-	-	-	-	-	-	-	-	-	-
		300	141	42.300	-	18	7.614	2.420	16	38,720	-	20	7,744	-	-	-	-	-	-	-	-	-	-	-	-	-
		1,460	22.5	32.850	-	18	5.913	880	10	8.800	-	20	1.760	-	-	-	-	-	-	-	-	-	-	-	-	-
								1,760	23	40.480	-	20	8.096	-	-	-	-	-	-	-	-	-	-	-	-	-
								3,080	32	98.560	-	20	19,712	-	-	-	-	-	-	-	-	-	-	-	-	-
								4,100	16	65,600	-	20	13,120	-	-	-	-	-	-	-	-	-	-	-	-	-
								1,480	47.5	70,300	-	20	14,060	-	-	-	-	-	70	3	30	16	41,601	-	-	-
								30	156	4.680	-	22	1,029 60	-	-	-	-	-	-	-	-	-	-	-	-	-
							52.661 40						101,349 60					21,380					41,601			

Subdivision 2.

From the mouth of Little Wills' Creek to Cumberland.

	AQUEDUCTS.					LOCKS.				CULVERTS.			BRIDGES.			SUNDRIES.											TOTAL.	
																PUDDLING.			PAVING.			FENCING.			SUNDRIES.				
Amount.	Length in yards.	No. of arches.	Span of arches.	Height of piers.	Amount.	No.	Lift in feet.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	Cubic yards.	Price.	Amount.	Squ. yds.	Price.	Amount.	Distance in miles.	Price.	Amount.		Amount.		
Dollars.			Feet.	Feet.	Dollars.			Dollars.	Dollars.		Dolls.	Dollars.		Dolls.	Dollars.		Cents.	Dollars.		Cents.	Dollars.		Dollars.	Dollars.		Dollars.	Dollars.	Cts.
1,860	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15,787	60
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,720	
-	-	-	-	-	-	6	48	1,500	72,000	1	300	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	86,715	
14,823	-	-	-	-	-	2	16	-	24,000	1	-	300	-	-	-	20,740	12	2,488	-	-	-	-	-	-	-	-	60,672	28
2,002	-	-	-	-	-	1	8	-	12,000	-	-	-	-	-	-	3,740	12	448	-	-	-	-	-	-	-	-	17,442	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,249	84
-	-	-	-	-	-	4	32	-	48,000	1	-	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65,040	
28,248	-	-	-	-	-	-	-	-	-	-	-	300	-	-	-	11,220	12	1,346	-	-	-	-	-	-	-	-	35,174	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,632	88
-	-	1	30	15	15,284	6	48	-	72,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	115,364	
1,710	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Gates & waste weirs	600	3,806	
28,228	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7,480	12	897	-	-	-	-	-	-	-	-	34,243	80
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6,906	
-	-	1	30	12	16,320	5	40	-	60,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	132,007	50
6,416	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Gate & waste weir	600	18,200	
5,760	-	-	-	-	-	1	8	-	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20,901	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17,135	40
-	-	1	30	15	15,000	7	56	-	84,000	2	300	600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	196,690	
6,416	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Gate & waste weir	600	18,200	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,574	78
-	-	3	30	15	40,572	2	16	-	24,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	82,986	
54,587	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33,660	16	5,385	-	-	-	-	-	-	-	-	199,876	
1,856	-	-	-	-	-	2	16	-	24,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26,348	
-	-	-	-	-	-	3	21	-	31,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	68,502	24
5,600	-	-	-	-	-	5	36	-	54,000	-	-	-	6	500	3,000	-	-	-	-	-	-	-	-	-	-	-	66,230	
-	-	-	-	-	-	-	-	-	-	-	-	-	6	300	1,800	-	-	-	6,308	81	5,109	11 miles.	900	9,900	-	-	19,809	
87,506					87,176				517,500			1,800			4,800			10,562			5,109			9,900		1,800	1,324,713	32
																							Per mile.					
21,380	-	-	-	-	-	-	Guard	-	14,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	54,305	20
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37,274	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18,763	20
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15,358	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7,673	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,096	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19,712	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13,120	
-	70	3	30	16	41,601	-	-	-	-	2	300	600	3	500	1,500	-	-	-	-	-	-	-	-	-	-	-	57,761	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	940 yds.	900	480	Waste gate & weir	800	2,339	60
21,380					41,601				14,000			600			1,500									480		800	*231,051	00
																									Total of this subdivision		1,555,764	32

* The amount $231,051 on account of a greater length of feeder, equal to $8,821, ought to be $234,872.

Map, Sheet M. No. 3. Profile, Sheet M. Nos. 3 & 4.			EXCAVATION.						EMBANKMENT.						WALLING.					AQUEDUCTS.						
Length of portion.	Distance from beginning of subdivision.		Distance in Yards.	Reduced area. S. Y.	Cubic Yards.	No. of Stages.	Price.	Amount.	Distance in yards.	Reduced area. S. Y.	Cubic Yards.	No. of Stages.	Price.	Amount.	Distance in yards.	Reduced area. S. Y.	Cubic Yards.	Price.	Amount.	Length in yards.	No. of arches.	Span of arches.	Height of piers.	Amount.	No.	Lift in feet.
Yards.	Miles.	Yards.					Dolls.	Dolls.					Cents.	Dolls.				Dolls.	Dolls.			Ft.	Ft.	Dolls.		
Deep cutting			1,060	82.6	87,559	.	1.62	141,840 72	.	.	.	.	.	.	.	.	.	.	.	.	.			.	.	.
dam & feeder.	.	.	4,204	17.	71,468	.	20	14,293 60	100	720.	72,000	.	22	15,840	40	50.91	2,036	4 00	8,145 60	.	.			.	.	.
			1,760	20.	35,200	.	62	21,824 00	-	.	.	.	-	.	.	.	.	.	.	.	.			.	.	.
Dam and basin	in Flaugherty, 880 yards.		.	.	.	.	.	.	160	87.5	14,000	.	22	3,080	20	11.	220	4 00	880	.	.			.	.	.
440	0	440	440	22.5	9,900	.	18	1,782 00	.	.	.	.	.	.	.	.	.	.	.	.	.			.	2	16
1,100	0	1,540	1,100	22.9	25,190	.	17	4,282 30	.	.	.	.	.	.	.	.	.	.	.	.	.			.	1	8
660	1	440	660	38.5	25,410	.	42	10,672 20	.	.	.	.	.	.	660	13.2	8,712	1 40	12,196 80	.	.			.	.	.
2,200	2	880	2,200	22.5	49,500	.	18	8,910 00	.	.	.	.	.	.	.	.	.	.	.	.	.			.	1	8
380	2	1,260	.	.	.	.	.	.	330	174	57,420	.	22	12,632 40	.	.	.	.	.	50	1	30	12	17,227	.	.
Dam & feeder	.	.	440	17.	7,480	.	18	1,346 40	130	60	7,800	.	22	1,716 00	20	8.	160	4 00	640	.	.			.	.	.
940	3	440	940	22.9	21,526	.	18	3,874 68	.	.	.	.	.	.	.	.	.	.	.	.	.			.	1	8
440	3	880	440	38.5	16,940	.	42	7,114 80	.	.	.	.	.	.	440	13.2	5,808	1 40	8,131 20	.	.			.	.	.
1,320	4	440	1,320	22.5	29,700	.	18	5,346 00	.	.	.	.	.	.	.	.	.	.	.	.	.			.	1	8
1,320	5	00	1,320	48.	63,360	.	62	39,283 20	.	.	.	.	.	.	1,320	17.1	22,572	1 40	31,600 80	.	.			.	.	.
1,320	5	1,320	1,320	22.5	29,700	.	18	5,346 00	.	.	.	.	.	.	.	.	.	.	.	40	1	30	12	15,637	2	16
Dam & feeder	.	.	360	17.	6,120	.	40	2,448 00	.	.	.	.	.	.	130	10.7	1,391	4 00	5,564 00	.	.			.	.	.
880	6	440	880	48.	42,240	.	62	26,188 80	.	.	.	.	.	.	880	17.1	15,048	1 40	21,067 20	.	.			.	2	16
880	6	1,320	880	20.	17,600	.	62	10,912 00	.	.	.	.	.	.	880	6.5	5,720	1 40	8,008 00	.	.			.	2	16
880	7	440	880	59.6	52,448	.	62	32,517 76	.	.	.	.	.	.	880	23.3	20,504	1 40	28,705 60	.	.			.	1	8
1,320	8	00	1,320	20.	26,400	.	42	11,088 00	.	.	.	.	.	.	1,320	6.5	8,580	1 40	12,012 00	.	.			.	1	8
880	8	880	880	59.6	52,448	.	62	32,517 76	.	.	.	.	.	.	880	23.3	20,504	1 40	28,705 60	.	.			.	1	8
1,760	9	880	1,760	22.5	39,600	.	18	7,128 00	.	.	.	.	.	.	.	.	.	.	.	.	.			.	.	.
1,760	10	880	1,760	20.	35,200	.	62	21,824 00	.	.	.	.	.	.	1,760	6.5	11,440	1 40	16,016 00	.	.			.	1	8
1,320	11	440	1,320	22.5	29,700	.	22	6,534 00	.	.	.	.	.	.	.	.	.	.	.	.	.			.	2	16
1,540	12	220	1,540	22.5	34,650	.	17	5,890 50	.	.	.	.	.	.	.	.	.	.	.	.	.			.	2	16
660	12	880	660	38.5	25,410	.	62	15,754 20	.	.	.	.	.	.	660	13.2	8,712	1 40	12,196 80	.	.			.	.	.
1,320	13	440	1,320	15.3	20,196	.	42	8,482 32	210	174	36,540	.	22	8,038 80	1,320	4.8	6,336	1 40	8,870 40	40.	1	30		14,835	2	16
Dam & feeder	.	.	660	20.	13,200	.	18	2,376 00	150	204	33,600	.	18	6,048 00	150	10.7	1,605	4 00	6,420 00	.	.			.	.	.
1,320	14	00	1,320	38.5	50,820	.	63	32,016 60	.	.	.	.	.	.	1,320	13.2	17,424	1 40	24,393 60	.	.			.	1	8
880	14	880	880	59.6	52,448	.	62	32,517 76	.	.	.	.	.	.	880	23.3	20,504	1 40	28,705 60	.	.			.	.	.
1,760	15	880	1,760	25.2	44,352	.	63	27,941 76	.	.	.	.	.	.	1,760	8.1	14,256	1 40	19,958 40	.	.			.	3	24
660	15	1,540	660	59.6	39,336	.	63	24,781 68	.	.	.	.	.	.	660	23.3	15,378	1 40	21,529 20	.	.			.	1	8
440	16	220	440	22.5	9,900	.	18	1,782 00	.	.	.	.	.	.	.	.	.	.	.	.	.			.	.	.
Miscellaneous items of subdivision																										
								568,617 04						47,355 20					303,746 80					47,699		

SUBDIVISION 1.

From the West end of the Tunnel to the Mouth of Middle Fork Creek.

	Aqueducts.					Locks.				Culverts.			Bridges.			Sundries.											Total.	
	Length in yards.	No. of arches.	Span of arches.	Height of piers.	Amount.	No.	Lift in feet.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	Puddling. Cubic Yards.	Puddling. Price.	Puddling. Amount.	Paving. Sq. Yds.	Paving. Price.	Paving. Amount.	Fencing. Distance.	Fencing. Price.	Fencing. Amount.	Sundries.	Sundries. Amount.	Dollars.	Cents.
			Ft.	Ft.	Dolls.			Dolls.	Dolls.		Dolls.	Dolls.		Dolls.	Dolls.		Cents.	Dolls.		Cents.	Dolls.	Miles.	Dolls.	Dolls.		Dolls.		
	.	.			.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	141,340	72
60	.	.			.	.	.	.	.		.	.	.	.	.	4,300	12	516	3,560	81	3,100	.	.	.	Gallery, &c.	1,200	43,095	20
	.	.			.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	Waste Weir	600	22,424	00
	.	.			.	.	.	.	.		.	.	.	.	.	2,144	12	257	1,792	81	1,451	.	.	.	.	.	5,668	00
	.	.			.	2	16	1,500	24,000		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	25,782	00
	.	.			.	1	8	1,500	12,000		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	16,282	30
80	.	.			.	.	.	.	.		.	.	.	.	.	11,220	12	1,246	1,320	81	1,069	.	.	.	.	.	25,184	00
	.	.			.	1	8	.	12,000		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	20,910	00
	50	1	30	12	17,227	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	29,859	40
	.	.			.	.	.	.	.		.	.	.	.	.	1,391	12	167	1,157	81	947	.	.	.	Gate & Weir	600	5,416	40
	.	.			.	1	8	.	12,000		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	15,874	68
20	.	.			.	.	.	.	.		.	.	.	.	.	7,480	12	898	990	81	802	.	.	.	.	.	16,946	00
	.	.			.	1	8	.	12,000		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	17,346	00
80	.	.			.	.	.	.	.		.	.	.	.	.	22,440	12	2,693	3,300	81	2,773	.	.	.	.	.	76,350	00
	40	1	30	12	15,637	2	16	.	24,000		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	44,983	00
00	.	.			.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	Gate & Waste Weir	1,200	9,212	00
20	.	.			.	2	16	.	24,000		.	.	.	.	.	14,960	12	1,795	2,100	81	1,701	.	.	.	.	.	74,752	00
00	.	.			.	2	16	.	24,000		.	.	.	.	.	14,960	12	1,795	2,100	81	1,701	.	.	.	.	.	46,416	00
60	.	.			.	1	8	.	12,000		.	.	.	.	.	14,960	12	1,795	2,100	81	1,701	.	.	.	.	.	76,719	36
00	.	.			.	1	8	.	12,000		.	.	.	.	.	22,440	12	2,692	3,300	81	2,773	.	.	.	.	.	40,565	00
60	.	.			.	1	8	.	12,000		.	.	.	.	.	14,960	.	1,795	2,100	81	1,701	.	.	.	.	.	76,719	36
	.	.			.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7,128	00
00	.	.			.	1	8	.	12,000		.	.	.	.	.	29,920	12	3,590	4,200	81	3,402	.	.	.	.	.	56,832	00
	.	.			.	2	16	.	24,000		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	30,534	00
	.	.			.	2	16	.	24,000		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	29,890	50
80	.	.			.	.	.	.	.		.	.	.	.	.	11,220	12	1,346	1,650	81	1,336	.	.	.	.	.	30,633	00
40	40	1	30		14,835	2	16	.	24,000		.	.	.	.	.	22,440	12	2,693	3,300	81	2,673	.	.	.	.	.	69,592	52
00	.	.			.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	Waste Gate & Weir	800	15,644	00
60	.	.			.	1	8	.	12,000		.	.	.	.	.	22,440	12	2,693	3,300	81	2,673	.	.	.	.	.	73,776	20
60	.	.			.	.	.	.	.		.	.	.	.	.	14,960	12	1,795	2,100	81	1,701	.	.	.	.	.	64,719	36
40	.	.			.	3	24	.	36,000		.	.	.	.	.	29,920	12	3,590	.	.	.	.	.	.	.	.	87,490	16
20	.	.			.	1	8	.	12,000		.	.	.	.	.	11,220	12	1,346	.	.	.	.	.	.	.	.	59,656	88
	.	.			.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1,782	00
	.	.			.	.	.	.	.	48	300	14,400	{2 / 8}	{500 / 300}	3,400	.	.	.	.	.	.	11	900	9,900	.	.	27,700	00
80					47,699				324,000			14,400			3,400			32,702			31,504			9,900		4,400	1,387,724	04

Basin and Deep Cut excluded . . $1,240,215 82

Map sheet M, No. 3. Profile same.		EXCAVATION.						EMBANKMENT.						WALLING.					AQUEDUCTS.						
Length of portion.	Distance from beginning of subdivision. Miles Yards.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of stages.	Price. Dolls.	Amount. Dollars.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of stages.	Price. Dolls.	Amount. Dollars.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	Price. Dolls.	Amount. Dollars.	Length in yards.	No. of arches.	Span of arches in feet.	Height of piers in feet.	Amount. Dollars.	No.	Lift in feet.
400	0 400	.	.	.	.	.	.	300	120	36,000	.	.22	7,920 00	.	.	.	.	.	100.	1	30	.	17,590	.	.
220	0 620	220	22.5	4,950	.	.18	891 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
550	0 1,170	550	59.6	32,780	.	.63	20,651 40	.	.	.	.	.	.	550	23.3	12,815	1.40	17,941 00	.	.	.	.	.	1	8
1,210	1 620	1,210	22.5	27,225	.	.20	4,445 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	16
1,540	2 440	1,540	22.5	34,650	.	.18	6,237 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	16
1,320	2 1,720	1,320	15.3	20,196	.	.42	8,482 32	.	.	.	.	.	.	1,320	4.8	6,336	1.40	8,870 40	.	.	.	.	.	2	16
660	3 620	660	59.6	39,336	.	.63	24,781 68	.	.	.	.	.	.	660	23.3	15,378	1.40	21,529 20	.	.	.	.	.	1	8
Dam & feeder	. .	440	17.0	7,480	.	.18	1,346 49	130	60	7,800	.	.22	1,716 00	20	8.	160	4.	640 00	.	.	.	.	.	.	.
880	3 1,500	880	59.6	52,448	.	.62	32,517 76	.	.	.	.	.	.	880	23.3	20,504	1.40	28,705 60	.	.	.	.	.	2	16
2,640	5 620	2,640	22.5	59,400	.	.18	10,692 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	40
440	5 1,060	440	25.2	11,088	.	.63	6,985 44	.	.	.	.	.	.	440	8.1	3,564	1.40	4,989 60	.	.	.	.	.	1	8
1,320	6 620	1,320	59.6	78,672	.	.63	49,563 36	.	.	.	.	.	.	1,320	23.3	30,756	1.40	43,058 40	.	.	.	.	.	3	24
1,760	7 620	1,760	59.6	104,896	.	.63	66,084 48	.	.	.	.	.	.	1,760	23.3	41,008	1.40	57,411 20	.	.	.	.	.	4	32
550	7 1,170	550	38.5	21,175	.	.63	13,340 25	.	.	.	.	.	.	550	13.2	7,260	1.40	10,164 00	.	.	.	.	.	1	8
1,210	8 620	1,210	44.0	53,240	.	.17	9,050 80	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	24
1,320	9 180	1,320	31.5	41,580	.	.63	26,195 40	.	.	.	.	.	.	1,320	10.4	13,728	1.40	19,219 00	.	.	.	.	.	3	24
440	9 620	440	59.6	26,224	.	.63	16,521 12	.	.	.	.	.	.	440	23.3	10,252	1.40	14,352 80	.	.	.	.	.	.	.
Dam & feeder	. .	660	20.0	13,200	.	.18	2,376 00	150	254	33,600	.	.18	6,048 00	150	10.7	1,605	4.	6,420 00	.	.	.	.	.	.	.
1,760	10 620	1,760	22.9	40,304	.	.17	2,821 28	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	32
880	10 1,500	880	22.9	20,152	.	.18	3,627 36	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	8
880	11 620	880	59.6	52,448	.	.63	33,042 24	.	.	.	.	.	.	880	23.3	20,504	1.40	28,705 60	.	.	.	.	.	1	8
13,750	19 590	13,750	22.9	314,875	.	.21	66,123 75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	16	124
440	19 1,030	440	34.0	14,960	.	.21	3,141 60	.	.	.	.	.	.	.	.	.	.	.	80	4	30	.	50,486	1	8
Dam & feeder	. .	820	17.0	13,940	.	.18	2,509 20	90	22	1,980	.	.22	435 60	90	11.	990	4.	3,960 00	.	.	.	.	.	.	.
Dam & feeder	. .	1,810	17.0	30,770	.	.18	5,538 60	120	20	2,400	.	.22	528 00	120	10.	1,200	4.	4,800 00	.	.	.	.	.	.	.
Miscellaneous	items of sub	division	.	.	.	.	-	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	19 1,030						416,965 53						16,647 60					270,766 80					68,076	53	420

SUBDIVISION 2. From the mouth of Middle Fork Creek to the mouth of Casselman's River.

AQUEDUCTS.					LOCKS.				CULVERTS.			BRIDGES.			SUNDRIES.										TOTAL.
															PUDDLING.			PAVING.			FENCING.			SUNDRIES.		
Length in yards.	No. of arches.	Span of arches in feet.	Height of piers in feet.	Amount. Dollars.	No.	Lift in feet.	Price. Dollars.	Amount. Dollars.	No.	Price. Dolls.	Amount. Dollars.	No.	Price. Dollars.	Amount. Dollars.	Cubic yrds.	Price. Cents.	Amount. Dollars.	Square yards.	Price. Cents.	Amount. Dollars.	Distance. Miles.	Price.	Amount. Dollars.		Amount. Dollars.	Dollars. Cts.
00.	1	30	.	17,590	.	.	.	.	.	.	.	.	.	.	5,100	12	612	.	.	.	.	.	.	.	.	26 122 00
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	891 00
.	.	.	.	.	1	8	1,500	12,000	.	.	.	.	.	.	9,350	12	1,122	.	.	.	.	.	.	.	.	51.714 40
.	.	.	.	.	2	16	do	24.000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	28.445 00
.	.	.	.	.	2	16	do	24.000	1	.	800	.	.	.	22,440	12	2,693	.	.	.	.	.	.	.	.	33 730 00
.	.	.	.	.	2	16	do	24,000	1	.	800	.	.	.	.	.	.	.	.	.	.	.	.	.	.	42.152 72
.	.	.	.	.	1	8	do	12,000	.	.	.	.	.	.	11,220	12	1.346	.	.	.	.	.	.	.	.	59 656 88
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.391	12	167	115	81	947	.	.	.	gate and weir	600	5.416 49
.	.	.	.	.	2	16	do	24.000	.	.	.	.	.	.	14,960	12	1,795	2,100	81	1,761	.	.	.	.	.	88.719 36
.	.	.	.	.	5	40	do	60.000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	70,692 00
.	.	.	.	.	1	8	do	12,000	.	.	.	.	.	.	7,480	12	897	.	.	.	.	.	.	.	.	24.872 04
.	.	.	.	.	3	24	do	36.000	.	.	.	.	.	.	22,440	12	2.693	.	.	.	.	.	.	.	.	131.314 76
.	.	.	.	.	4	32	do	48.000	.	.	.	.	.	.	29.920	12	3.580	.	.	.	.	.	.	.	.	175 075 68
.	.	.	.	.	1	8	do	12.000	1	.	900	.	.	.	9,350	12	1,122	.	.	.	.	.	.	.	.	37.526 25
.	.	.	.	.	3	24	do	36,000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	45.050 80
.	.	.	.	.	3	24	do	36,000	.	.	.	.	.	.	22,440	12	2,693.	.	.	.	.	.	.	.	.	84.107 40
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7,480	12	898	.	.	.	.	.	.	.	.	31.771 92
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	waste gate & weir	800	15.644 00
.	.	.	.	.	4	32	do	48,000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	50 821 23
.	.	.	.	.	1	8	do	12.000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	15.627 36
.	.	.	.	.	1	8	do	12.000	.	.	.	.	.	.	14,960	12	1,795	.	.	.	.	.	.	.	.	75.542 84
.	.	.	.	.	16	124	do	180.000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	252,123 75
80	4	30	.	50,486	1	8	do	12.000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	65,627 60
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	gate	400	7.304 80
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	gate & waste weir	1,200	12.066 60
.	.	.	.	.	.	.	.	.	36	300	10,800	3 / 8	500 / 300	3,900	.	.	.	.	.	.	14	900	12,600	.	.	27,300 00
				68,076	53	420		630,000			13,300			3,900			21,413			2,708			12.600			1,459.316 93

Map sheet S, No. 2. Profile sheet S, No. 9.			EXCAVATION.						EMBANKMENT.						WALLING.					AQUEDUCTS.					
Length of portion.	Distance from beginning of subdivision. Miles.	Yards.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of stages.	Price. Dols. Cts.	Amount. Dollars. Cents.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of stages.	Price. Cents.	Amount. Dollars.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	Price. Dollars.	Amount. Dollars.	Length in yards.	No. of arches.	Span of arches in feet.	Height of piers in feet.	Amount. Dollars.	No.
2,666	1	906	2,666	22.5	59,985	.	17	10,197 45	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
938	2	79	938	38.5	35,920	.	17	6,106 48	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
2,050	3	349	2,050	67	136,010	.	34	46,243 40	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
1,266	3	1,055	1,266	58	73,428	.	27	19,825 56	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
483	4	338	.	.	.	.	.	.	483	58	28,014	.	20	5,602 80	483	16	7,728	3	23,184	.	.	.	.	.	2
1,650	5	228	1,650	38.5	63,525	.	22	13,975 50	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
106	5	334	.	.	.	.	.	.	106	25	2,650	.	20	530	106	12	1,272	3	3,816	.	.	.	.	.	.
4,210	7	1,024	4,210	58	244,180	.	22	53,719 60	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
200	7	1,224	.	.	.	.	.	.	200	50	10,000	.	20	2,000	200	14	2,800	3	8,400	.	.	.	.	.	.
770	8	234	770	67	51,590	.	34	17,540 60	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2,750	9	1,224	2,750	35	96,250	.	27	25,987 50	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3
70	9	1,294	.	.	.	.	.	.	70	50	3,500	.	20	700	70	14	980	3	2,940	.	.	.	.	.	.
280	9	1,574	280	73	20,440	.	110	22,484	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Feeder			.	.	30,660	.	98	29,988	.	.	.	.	.	.	.	.	3,360	5	16,800	.	.	.	.	.	.
655	10	469	655	34	22,270	.	98	21,824 60	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	} 12
655	10	1,124	.	.	.	.	.	.	655	39	22,270	.	20	4,454	.	.	.	.	.	.	.	.	.	.	
1,800	11	1,164	1,800	100	180,000	.	27	48,600	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
13,000	19	84	13,000	35.4	460,200	.	32	147,264	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	22
584	19	668	.	.	.	.	.	.	584	50	29,200	.	20	5,840	584	14	8,176	3	24,528	50	1	30	.	25,416	.
Reservoir & feeder		.	880	11	9,680	.	27	2,613 60	105	.	6,037.5	.	20	1,207 40	33	16	528	4 05	2,270 40	.	.	.	.	.	.
3,930	21	1,078	3,930	67	262,310	.	34	89,185 40	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
810	22	128	.	.	.	.	.	.	810	50	40,500	.	20	8,100	810	14	11,340	3	34,020	.	.	.	.	.	.
1,870	23	238	1,870	35	65,450	.	32	20,944	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
257	23	495	.	.	.	.	.	.	257	58	15,006	.	20	3,001 20	257	16	4,112	3	12,336	.	.	.	.	.	.
950	23	1,445	950	35	33,250	.	32	10,640	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
2,050	24	1,735	2,050	22.5	46,125	.	22	10,147 50	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
480	25	455	480	57	32,160	.	34	10,934 40	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
720	25	1,175	720	58	41,760	.	22	9,187 20	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
3,225	27	880	3,225	32	103,200	.	22	22,704	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Miscellaneous items of subdivision			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
47,520=	27	880	26m 355y		2,068,336			640,112 79	3,270		157,177			31,435 40	2,543		40,296		128,294 40					25,416	

SUBDIVISION 1.

From the mouth of Casselman's River to Connelsville.

Amount. Dollars.	AQUEDUCTS. Length in yards.	No. of arches.	Span of arches in feet.	Height of piers in feet.	Amount. Dollars.	LOCKS. No.	Lift in feet.	Price. Dollars.	Amount. Dollars.	CULVERTS. No.	Price. Dollars.	Amount. Dollars.	BRIDGES. No.	Price. Dollars.	Amount. Dollars.	SUNDRIES. PUDDLING. Cub. yds.	Price. Cents.	Amount. Dollars.	PAVING. Sq. yds.	Price. Cents.	Am't. Dolls.	FENCING. Distance. Miles.	Price. Dolls.	Amount. Dollars.	SUNDRIES.	Amount. Dollars.	TOTAL. Dollars. Cents.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10,197 45
.	.	.	.	.	.	2	16	1,500	24,000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	80,106 48
.	.	.	.	.	.	1	8	1,500	12,000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	58,243 40
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	19,825 56
3,184	.	.	.	.	.	2	16	1,500	24,000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	52,786 80
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	13,975 50
3,816	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4,346
.	.	.	.	.	.	4	32	1,500	48,000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	101,719 60
3,400	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10,400
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	17,540 60
.	.	.	.	.	.	3	24	1,500	36,000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	61,987 50
2,940	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3,640
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	22,484
5,800	.	.	.	.	.	.	guard lock	.	16,000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	62,788
.	.	.	.	.	.	12	96	1,500	144,000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	21,824 60
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	148,454
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	48,600
.	.	.	.	.	.	22	176	1,500	264,000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	411,264
1,528	50	1	30	.	25,416	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	55,784
2,270 40	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1,066	12	128	892	81	723	.	.	.	Gate, &c.	400	7,342 40
.	.	.	.	.	.	4	32	1,500	48,000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	137,185 40
4,020	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	42,120
.	.	.	.	.	.	1	8	1,500	12,000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	32,944
2,336	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	15,337 20
.	.	.	.	.	.	1	8	1,500	12,000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	22,640
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10,147 50
.	.	.	.	.	.	.	.	.	.	21	300	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10,934 40
.	.	.	.	.	.	2	16	1,500	24,000	2	400	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	33,187 20
.	.	.	.	.	.	.	.	.	.	4	450	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	22,704
.	.	.	.	.	.	.	.	.	.	3	600	10,700	1 3	500 300	1,400	77,730	12	9,327	.	.	.	3	900	2,700	2 waste weir	800	24,927
3,294 40					25,416				664,000			10,700			1,400			9,455			723			2,700		1,200	1,515,486 59

Map, Sheet S. No. 3.
Profile, Sheet S. Nos. 9 & 10.

Length of portion.	Distance from beginning of Subdivision	EXCAVATION. Distance in Yards.	Reduced area. S. Y.	Cubic Yards.	No. of Stages.	Price.	Amount.	EMBANKMENT. Distance in Yards.	Reduced area. S. Y.	Cubic Yards.	No. of Stages.	Price.	Amount.	WALLING. Distance in Yards.	Reduced area. S. Y.	Cubic Yards.	Price.	Amount.	AQUEDUCTS. Length in Yds.	No. of arches.	Span of arches.	Height of piers.	Amount.	LOCKS. No.	Lift in feet.	Price.
Yards.	*Miles. Yds.*					*Cents.*	*Dolls.*					*Cents.*	*Dolls.*				*Dolls.*	*Dolls.*			*Feet.*	*Feet.*	*Dolls.*			*Dolls.*
1,330	0 1,330	1,330	58	77,140	2	22	16,970 80	300	317	95,900		20	20,922 00	.	.	.	.	.	50	2	30		34,240	2	16	1,500
Basin .	.	.	.	19,540	1	17	3,321 80	.	.	.		.	.	.	.	700	3 00	2,100					.	to River	.	.
Feeder .	.	2,640	18	47,520		24	11,404 80	.	.	.		.	4,000 00	.	.	.	.	.					.	.	.	.
350	0 1,680	.	.	.		.	.	350	40	14,000		22	3,080 00	350	12.	4,200	4 00	16,800					.	1	8	1,500
3,960	3 360	3,960	35	138,600		24	33,264 00	.	.	.		.	.	.	.	.	.	.					.	2	16	1,500
1,730	4 330	.	.	.		.	.	1,730	58	100,340		22	22,074 80	1,730	14.	24,220	4 50	108,990					.	1	8	1,500
580	4 910	580	23	13,340		17	2,267 80	.	.	.		.	.	.	.	.	.	.					.	.	.	.
250	4 1,160	.	.	.		.	.	250	58	14,500		22	3,190 00	250	14.	3,500	4 50	15,750					.	.	.	.
840	5 240	840	35	29,400		21	6,174 00	.	.	.		.	.	.	.	.	.	.					.	.	.	.
500	5 740	500	22.5	11,250		17	1,912 50	.	.	.		.	.	.	.	.	.	.					.	.	.	.
2,820	7 40	2,820	96	230,720		17	39,222 40	.	.	.		.	.	.	.	.	.	.					.	.	.	.
330	7 370	.	.	.		.	.	330	58	19,140		22	4,210 80	330	14.	4,620	4 50	20,790					.	.	.	.
2,200	8 810	2,200	54	118,800		18	21,384 00	.	.	.		.	.	.	.	.	.	.					.	.	.	.
710	8 1,520	.	.	.		.	.	710	64	45,440		22	9,996 80	710	16.	11,360	4 50	51,120					.	.	.	.
2,110	10 110	2,110	34	71,740		20	14,348 00	.	.	.		.	.	.	.	.	.	.					.	1	8	1,500
1,740	11 90	1,740	67	116,580		34	39,637 20	.	.	.		.	.	.	.	.	.	.					.	1	8	1,500
2,840	12 1,170	2,840	54	153,360		17	26,071 20	.	.	.		.	.	.	.	.	.	.					.	2	16	1,500
Feeder .	.	900	34	30,600		98	29,988 00	.	.	.		.	.	160	21.	3,360	5 00	16,800					.	Guard-	Lock	.
1,610	13 1,020	1,610	96	154,560		17	26,275 20	.	.	.		.	.	.	.	.	.	.					.	1	8	1,500
70	13 1,090	.	.	.		.	.	70	58	4,060		22	893 20	70	14.	980	4 50	4,410					.	.	.	.
800	14 130	800	22.5	18,000		17	3,060 00	.	.	.		.	.	.	.	.	.	.					.	.	.	.
1,140	14 1,270	1,140	96	108,840		17	18,502 80	.	.	.		.	.	.	.	.	.	.					.	1	8	1,500
70	14 1,340	.	.	.		.	.	70	64	4,480		22	985 60	70	16.	1,120	4 50	5,040					.	.	.	.
2,135	15 1,715	2,135	34	72,590		17	12,340 30	.	.	.		.	.	.	.	.	.	.					.	1	8	1,500
560	16 515	560	22.5	12,600		16	2,016 00	.	.	.		.	.	.	.	.	.	.					.	.	.	.
670	16 1,185	670	54	36,180		18	6,512 40	.	.	.		.	.	.	.	.	.	.					.	.	.	.
2,360	18 25	2,360	22.5	53 100		20	10,620 00	90	106	9,540		20	1,908 00	.	.	.	.	.	65	3	30	12	45,267	1	8	1,500
Feeder .	.	2,200	17	37,400		17	6,358 00	.	.	.		.	8,309 00	.	.	.	.	.					.	.	.	.
1,600	18 1,625	1,600	23	36,800		22	8,096 00	.	.	.		.	.	.	.	.	.	.					.	1	8	1,500
358	19 223	.	.	.		.	.	358	58	20,764		20	4,568 08	358	14.	5,012	4 50	22,554					.	.	.	.
4,430	21 1,133	4,430	22.5	99,675		21	20,931 75	.	.	.		.	.	.	.	.	.	.					.	.	.	.
720	22 93	.	.	.		.	.	720	58	41,760		22	9,187 20	720	16.	11,520	4 50	51,840					.	.	.	.
580	22 673	580	54	31,320		27	8,456 40	.	.	.		.	.	.	.	.	.	.					.	.	.	.
2,010	23 923	2,010	58	116,580		18	20,984 40	.	.	.		.	.	.	.	.	.	.					.	.	.	.
840	24 3	840	34	28,560		18	5,140 80	.	.	.		.	.	.	.	.	.	.					.	1	8	1,500
950	24 953	.	.	.		.	.	950	58	55,100		22	12,122 00	950	14.	13,300	4 50	19,850					.	.	.	.
1,310	25 503	1,310	58	75,980		22	16,715 60	.	.	.		.	.	.	.	.	.	.					.	.	.	.
2,100	26 843	2,100	58	121,800		22	26,796 00	.	.	.		.	.	.	.	.	.	.					.	.	.	.
1,270	27 353	1,270	54	68,580		27	18,516 60	.	.	.		.	.	.	.	.	.	.					.	1	8	1,500
Miscellaneous items of subdivision				.		.	.	.	.	.		.	.	.	.	.	.	.					.	.	.	.
		Miles. Yds.																								
47,273=	27 353	27 355		2,131,155			457,288 75	5,928		425,024			105,448 20	5,698		83,892		336,044					79,507			

SUBDIVISION 2.

From Connelsville to Sewickly Creek.

		AQUEDUCTS.					LOCKS.				CULVERTS.			BRIDGES.			SUNDRIES.										TOTAL.
																	PUDDLING.			PAVING.			FENCING.			SUNDRIES.		
Price.	Amount.	Length in Yds.	No. of arches.	Span of arches.	Height of piers.	Amount.	No.	Lift in feet.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	Cubic Yards.	Price.	Amount.	Squ. Yds.	Price.	Amount.	Distance.	Price.	Amount.		Amount.	Dollars. Cents.
Dolls.	Dolls.			Feet.	Feet.	Dolls.			Dolls.	Dolls.		Dolls.	Dolls.		Dolls.	Dolls.		Cts.	Dolls.				Miles.	Dolls.	Dolls.		Dolls.	
.	.	50	2	30		34,240	2	16	1,500	24,000	.	.	.	.	.	.	5,100	12	612		.	.	.	.	.	.	.	96,744 80
3 00	2,100					.	to River		.	30,000	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	65,421 80
.	.					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	Gate, &c.	400	15,804 80
4 00	16,800					.	1	8	1,500	12,000	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	31,880 00
.	.					.	2	16	1,500	24,000	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	57,264 00
4 50	108,990					.	1	8	1,500	12,000	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	143,064 80
.	.					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	2,267 80
4 50	15,750					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	18,940 00
.	.					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	6,174 00
.	.					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	1,912 50
.	.					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	39,222 40
4 50	20,790					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	25,000 80
.	.					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	21,384 00
4 50	51,120					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	61,116 80
.	.					.	1	8	1,500	12,000	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	26,348 00
.	.					.	1	8	1,500	12,000	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	51,637 20
.	.					.	2	16	1,500	24,000	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	50,071 20
5 00	16,800					.	Guard-	Lock	.	28,000	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	74,788 00
.	.					.	1	8	1,500	12,000	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	38,275 20
4 50	4,410					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	5,303 20
.	.					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	3,060 00
.	.					.	1	8	1,500	12,000	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	30,502 80
4 50	5,040					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	6,025 60
.	.					.	1	8	1,500	12,000	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	24,340 30
.	.					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	2,016 00
.	.					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	6,512 40
.	.	65	3	30	12	45,267	1	8	1,500	12,000	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	69,795 00
.	.					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	Gate, &c.	400	15,067 00
.	.					.	1	8	1,500	12,000	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	20,096 00
4 50	22,554					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	27,122 80
.	.					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	20,931 75
4 50	51,840					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	61,027 20
.	.					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	8,456 40
.	.					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	20,984 40
.	.					.	1	8	1,500	12,000	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	17,140 80
4 50	19,850					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	31,972 00
.	.					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	Basin at Robbstown	5,421	22,136 60
.	.					.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	26,796 00
.	.					.	1	8	1,500	12,000	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	30,516 60
.	.					.	.	.	.	.	29	300	8,700	6 5	500 300	4,500	162,126	12	19,355		.	.	27½	900	24,750	5 Waste Weirs	2,000	59,305 00
	336,044					79,507				262,000			8,700			4,500	..		19,967						24,750		8,221	1,806,425 95

Map sheet No. 4. Profile sheet No. 10.		EXCAVATION.						EMBANKMENT.						WALLING.					AQUEDUCTS.						
Length of portion.	Distance from beginning of subdivision. Miles. Yards.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of stages.	Price. Cents.	Amount. Dollars.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of stages.	Price. Cents.	Amount. Dollars.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	Price. Dolls.	Amount. Dollars.	Length in yards.	No. of arches.	Span of arches in feet.	Height of piers in feet.	Amount. Dollars.	No.	I
3,520	2	3,520	35	123,000	-	20	24,640	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2,890	3 630	2,890	54	229,060	1½	27	60,946 20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
6,610	6 1,660	6,310	22.5	141,175	-	20	28,395	-	-	-	-	-	-	-	-	-	-	-	60	3	30	12	38,014	-	
500	7 200	-	-	-	-	-	- -	300	142	43,600	-	22	9,592	-	-	-	-	-	50	2	30	12	27,354		
4,030	9 710	4,030	96	386,880	-	22	85,113 60	-	-	-	-	-	-	-	-	-	-	-	40	1	30	-	16,695	-	
255	9 965	-	-	-	-	-	- -	255	330	84,150	-	22	18,513	-	-	-	-	-	-	-	-	-	-	-	
5,540	12 1,225	5,540	142	786,680	-	24	188,803 20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1,720	13 1,185	1,720	34	58,480	-	17	9,741 60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
570	13 1,755	570	32	18,240	-	17	3,100 80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Basin at Pittsburg		-	-	78,160	-	17	13,287 20	-	-	-	-	-	-	-	-	2,800	4	11,200	-	-	-	-	-	3	
Miscellaneous items of subdivision				-	-	-	- -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
24,635=	13 1,755	13 1,200		1,821,875			414,027 60	555		127,750			28,105					11,200					82,063		

SUBDIVISION 4.

From the mouth of the Youghagany to Pittsburg.

mount. Dollars.	AQUEDUCTS. Length in yards.	No. of arches.	Span of arches in feet.	Height of piers in feet.	Amount. Dollars.	LOCKS. No.	Lift in feet.	Price.	Amount. Dollars.	CULVERTS. No.	Price. Dolls.	Amount. Dollars.	BRIDGES. No.	Price. Dollars.	Amount. Dollars.	SUNDRIES. PUDDLING. Cubic yds.	Price. Dolls.	Amount. Dollars.	PAVING. Squ. yds.	Price.	Am't.	FENCING. Distance in miles.	Price. Dlls.	Amount. Dollars.	SUNDRIES.	Amount. Dollars.	TOTAL. Dollars. Cents.
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.640
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60.946 20
-	60	3	30	12	38,014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	66.409
-	50	2	30	12	27,354		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36.946
-	40	1	30	-	16,695	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	101.808 60
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.513
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	188.803 20
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.741 60
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,100 89
1,200	-	-	-	-	-	3	-	-	36,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60,487 20
-	-	-	-	-	-	-	-	-	-	17	300	5,100	5 / 6	500 / 300	4,300	109,140	.12	13,096	-	-	-	14	900	12,600	waste weir	400	35,496
1,200					82,063				36,000			5,100			4,300			13,096						12,600		400	606,891 60

ewickly Creek to the

C

LIN(		SUNDRIES.				
Ma Pr ds.		PAVING.			FENCI	
		q. yards.	Price.	Amount.	Dist'ce in mls.	Price.
	D		Cents.	Dolls.		Dolls.
	10	3.200	81	2,592	-	-
	20,	-	-	-	-	-
	77,	-	-	-	-	-
		-	-	-	-	-
	15,	-	-	-	-	-
	23,	-	-	-	-	-
		-	-	-	-	-
	32,	-	-	-	-	-
	1,	-	-	-	-	-
		-	-	-	-	-
		-	-	-	-	-
4	24,	-	-	-	-	-
		-	-	-	-	-
		-	-	-	-	-
		-	-	-	-	-
		-	-	-	-	-
		-	-	-	-	-
		-	-	-	-	-
4	27	-	-	-	-	-
		-	-	-	-	-
4	3,	-	-	-	-	-
		-	-	-	16½	900
	236			2,592		

Map, Sheet S, No. 4. Profile, Sheet S, No. 10.		EXCAVATION.						EMBANKMENT.						WALLING.					AQUEDUCTS.				
Length of portion.	Distance from beginning of subdivision.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of stages.	Price.	Amount.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	No. of stages.	Price.	Amount.	Distance in yards.	Reduced area. S. Y.	Cubic yards.	Price.	Amount.	Length in yards.	No. of arches.	Span of arches in feet.	Height of piers in feet.	Amount.
Yards.	*Miles. Yards.*					*Cents.*	*Dolls. Cts.*					*Cents.*	*Dolls. Cts.*				*Dolls.*	*Dolls. Cts.*					*Dolls.*
Feeder -	-	3,520	17.	59,840		22	13,164 80	114	58	6,592		24	1,582 6	151	17.	2,567	4 00	10,268	-	-	-	-	-
3,700	2 180	3,700	58.	214,600		22	47,212	100	420	42,000		22	9,240	-	-	4,142	5 00	20,710	50	2	30	-	30,280
1,080	2 1,260	-	-	-		-	-	1,080	58	62,640		20	12,528	1,080	16.	17,280	4 50	77,760	-	-	-	-	-
1,810	3 1,310	1,810	22.5	40,725		20	8,145	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
170	3 1,480	-	-	-		-	-	170	65	11,050		20	2,210	170	20.	3,400	4 50	15,300	-	-	-	-	-
2,080	5 40	2,080	25.	52,000		98	50,960	-	-	-		-	-	2,080	8.1	16,848	1 40	23,587 20	-	-	-	-	-
1,750	6 30	1,750	22.5	39,375		20	7,875	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
684	6 714	-	-	-		-	-	684	58	39,672		22	8,727 84	684	16.	10,884	3 00	32,652	-	-	-	-	-
410	6 1,124	410	25.	9,150		98	9,467	-	-	-		-	-	410	8.1	1,321	1 40	1,849	-	-	-	-	-
1,436	7 94	1,430	58.	82,940		22	18,246 80	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
570	7 1,364	570	22.5	12,825		20	2,565	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
380	7 1,744	-	-	-		-	-	380	38	14,440		22	3,176 80	380	16.	6,080	4 00	24,320	-	-	-	-	-
1,350	8 1,334	1,350	58.	78,300		20	17,226	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
1,330	9 904	1,330	35.	46,550		20	9,310	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
1,970	10 1,114	1,970	34.	66,980		21	14,065 80	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
1,550	11 904	1,550	54.	83,700		24	20,088	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
1,210	12 354	1,210	22.5	28,225		17	3,798	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
900	12 1,254	900	54.	48,600		17	8,262	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
Feeder -	-	2,200	22.5	49,500		17	8,415	-	-	-		-	-	121	-	6,069	4 50	27,310	-	-	-	-	-
6,666	16 880	6,666	35.	233,310		20	46,662	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
Basin -	-	-	-	19,540		17	3,321 80	-	-	-		-	-	-	-	700	4 50	3,150	-	-	-	-	-
Miscellaneous items of subdivision				-		-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
19,040=	16 880	32,446		1,166,160			288,784 20	2,828		176,394			37,465 24	5,076		69,291		236,906 20					30,280

BDIVISION 3. From Sewickly Creek to the mouth of the Youghagany.

AQUEDUCTS.					LOCKS.				CULVERTS.			BRIDGES.			SUNDRIES.										TOTAL.	
Length in yards.	No. of arches.	Span of arches in feet.	Height of piers in feet.	Amount.	No.	Lift in feet.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	PUDDLING.			PAVING.			FENCING.			SUNDRIES.				
															Cubic yards.	Price.	Amount.	Sq. yards.	Price.	Amount.	Dist'ce in mls.	Price.	Amount.		Amount.	Dollars.	Cents.
				Dolls.			Dolls.	Dolls.		Dolls.	Dolls.		Dolls.	Dolls.		Cents.	Dolls.		Cents.	Dolls.		Dolls.	Dolls.		Dolls.		
-	-	-	-	-	2	-	-	27,000	-	-	-	-	-	-	3,500	13	455	3,200	81	2,592	-	-	-	Gate, &c.	400	85,412	40
50	2	30	-	30,280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	77,492	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90,288	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,145	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17,510	
-	-	-	-	-	1	8	1,500	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	86,547	20
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7,875	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	41,379	84
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11,316	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18,246	80
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,565	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27,496	80
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17,226	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9,310	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14,065	80
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20,088	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,798	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,262	
-	-	-	-	-	7	-	-	66,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	102,225	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	46,662	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6,471	80
-	-	-	-	-	-	-	-	-	21	300	6,300	3 / 4	500 / 300	2,700	120,309	12	14,437	-	-	-	16½	900	14,850	2 waste weirs	800	39,087	
				30,280				105,500			6,300			2,700			14,892			2,592			14,850		1,200	741,469	64

ADDITIONAL SUBDIVISION of the Eastern Section *of the Chesapeake and Ohio Canal, from the mouth of Savage River to Cumberland.*

Distance 30 miles 350 yards. Descent 312 feet. 39 Locks.

Map and Profile A. of 1824.

The Canal for this subdivision remains on the left bank of the Potomac. This plan was adopted after an attentive consideration of the relative advantages and disadvantages of passing the river several times, to follow the best ground. But, to do this, such frequent crossings would be necessary, and attended with so many inconveniencies and risks, that this project was deemed the less expedient.

As the object of this subdivision is to attain the coal mines near Savage river, it was considered whether this might not be attained by a canal of smaller dimensions and less perfect than the main line below; the result of which was, that the dimensions and plan of the principal canal were adhered to. For, 1st, it was found, on applying the calculations to the ground, that a very trifling decrease of expense would be made by decreasing materially the dimensions of the canal; and, 2d, the unfavorable character of the river to a lock and dam navigation, which was thought of as a substitute, rendered this scheme almost as expensive, and much inferior in usefulness to the independent canal.

The subdivison begins by a basin formed in the Potomac by a dam, immediately below the mouth of Savage river. The line immediately enters on a most difficult piece of ground, which continues more than half a mile; another half mile is then favorable, after which it continues difficult for three-fourths of a mile, to Westernport. It then becomes favorable, with the exception of several small portions, to the end of the seventh mile, when the great bend of the river, opposite to Paddy Town, causes the ground to become very rugged and difficult for a space of two miles. Below this for three miles the favorable ground is intersected by only small portions of rock side. For the ensuing five miles, the approach of Fort-hill to the river presents alternately some easy ground, but a large portion of very difficult nature, requiring much walling and excavation of rock. Below this, the ground is favorable for three miles, through Cressap's meadow, when difficulties again occur for two miles. The remaining distance to Cumberland is favorable, with the exception of three portions, which are not of very great extent, but which will require extensive works: an aqueduct over Wills' creek will be necessary.

About eight miles above Cumberland it is proposed to place a dam across the river, and to use its water not only for the supply of the lower part of this subdivision, but also of that below.

BERNARD, *Member of the Board of Internal Improvement.*
WM. TELL POUSSIN, *Capt. Top. Eng. & Ass't to the Board.*
W. HOWARD, *Civil Engineer, Assistant to the Beard.*

Washington, October 25, 1826.

CHESAPEAKE AND OHIO CANAL—Eastern Section. ADDITIONAL SUBDIVISION.

Map and Profile A, of 1824.		EXCAVATION.						EMBANKMENT.						WALLING.					AQUEDUCTS.					LOCKS.			
Length of portion.	Distance from beginning of subdivision	Distance in Yards.	Reduced area. S. Y.	Cubic Yards.	No. of Stages.	Price. Cents.	Amount. Dolls.	Distance in Yards.	Reduced area. S. Y.	Cubic Yards.	No. of Stages.	Price. Cents.	Amount. Dolls.	Distance in Yards.	Reduced area. S. Y.	Cubic Yards.	Price. Dolls.	Amount. Dolls.	Length in Yds.	No. of arches.	Span of arches. Feet.	Height of piers. Feet.	Amount. Dolls.	No.	Lift in feet.	Price. Dolls.	Amount. Dolls.
Dam	-	-	-	-		-	-	-	-	-		-	-	70	4.5	315	4 00	1,260 00	-	-	-	-	-	-	guard	1,500	12,000
1,240	0 1,240	-	-	-		-	-	1,240	42	52,000.80		22	11,457 60	1,240	11.	13,640	4 00	54,560 00	-	-	-	-	-	2	16	-	24,000
520	1 -	520	25.2	13,004		88	12,744 00	-	-	-		-	-	520	8.1	4,212	1 40	5,896 80	-	-	-	-	-	2	16	-	24,000
880	1 880	880	32.	28,160		18	5,068 80	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	2	16	-	24,000
1,020	2 140	1,020	59.6	60,792		63	38,298 96	-	-	-		-	-	1,020	23.3	23,706	1 40	33,188 40	40	2	20	12	24,676	1	8	-	12,000
450	2 590	450	20.	9,000		63	5,670 00	-	-	-		-	-	450	6.5	2,925	1 40	4,095 00	-	-	-	-	-	2	16	-	24,000
840	2 1,430	840	48.	40,320		63	25,401 60	-	-	-		-	-	840	17.1	14,364	1 40	20,109 60	-	-	-	-	-	2	16	-	24,000
2,300	4 210	2,300	12.	27,600		17	4,692 00	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- -	-	2,300	10.	23,000		62	14,260 00	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	2	16	-	24,000
800	4 1,010	-	-	-		-	-	800	42	33,600		20	6,720	800	12.	9,600	4 00	38,400 00	-	-	-	-	-	1	8	-	12,000
3,620	6 1,110	3,620	54.4	196,928		17	33,477 76	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	5	40	-	60,000
800	7 150	800	54.4	43,520		18	7,833 60	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	1	8	-	12,000
1,450	7 1,600	-	-	-		-	-	1,450	58	84,100		20	16,820	1,450	14.	20,300	4 00	81,200 00	-	-	-	-	-	-	-	-	-
1,000	8 840	1,000	25.2	25,200		62	15,624 00	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	1	8	-	12,000
630	8 1,470	-	-	-		-	-	630	58	36,540		20	7,308	630	14.	8,820	4 00	33,280 00	-	-	-	-	-	-	-	-	-
1,000	9 710	1,000	54.4	54,400		18	9,792 00	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	2	16	-	24,000
3,280	11 470	3,280	22.5	73,800		18	13,284 00	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	2	16	-	24,000
800	11 1,270	800	20.	16,000		63	10,080 00	-	-	-		-	-	800	6.5	5,200	1 40	7,280 00	-	-	-	-	-	2	16	-	24,000
1,600	12 1,110	-	-	-		-	-	1,600	42	67,200		20	13,240	1,600	14.	22,400	4 00	89,600 00	-	-	-	-	-	1	8	-	12,000
3,250	14 840	3,250	22.5	73,125		18	13,162 50	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	3	24	-	36,000
850	14 1,690	-	-	-		-	-	850	58	49,300		20	9,860	850	16.	13,600	4 00	54,400 00	-	-	-	-	-	-	-	-	-
360	15 290	360	54.4	19,584		21	4,112 64	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	1	8	-	12,000
1,520	16 50	1,520	30.	45,600		18	8,208 00	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	1	8	-	12,000
640	16 690	-	-	-		-	-	640	32	20,480		20	4,096	640	12.	7,680	4 00	30,720 00	-	-	-	-	-	-	-	-	-
7,010	20 660	7,010	22.5	157,725		24	37,854 00	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	4	32	-	48,000
340	20 1,000	340	58.	19,720		24	4,732 80	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,470	21 710	-	-	-		-	-	1,470	24	35,280		20	7,056	1,470	10.7	15,729	4 00	62,916 00	-	-	-	-	-	1	8	-	12,000
Dam & feeder	-	440	22.	9,680		40	3,872 00	-	-	-		-	-	120	8.	960	4 00	3,840 00	-	-	-	-	-	-	guard	-	12,000
2,300	22 1,250	2,300	34.	78,200		18	14,076 00	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	1	8	-	12,000
610	23 100	610	34.	20,740		18	3,733 20	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,040	23 1,140	-	-	-		-	-	1,040	58	60,320		20	12,064	1,040	16.	16,440	4 00	65,760 00	-	-	-	-	-	-	-	-	-
2,800	25 420	2,800	22.5	63,000		17	10,710 00	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
620	25 1,040	-	-	-		-	-	620	58	35,960		20	7,192	620	16.	9,920	4 00	39,680 00	-	-	-	-	-	-	-	-	-
4,020	27 1,540	4,020	22.5	90,450		18	16,281 00	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
790	28 570	-	-	-		-	-	790	68	55,720		20	11,144	790	18.	14,220	4 00	66,880 00	-	-	-	-	-	-	-	-	-
1,240	29 50	1,240	58.	71,920		18	12,945 60	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
300	29 350	-	-	-		-	-	350	105	31,500		20	6,300	300	23.	6,900	4 00	27,600 00	-	-	-	-	-	-	-	-	-
1,460	30 50	1,460	22.5	32,850		18	5,913 00	-	-	-		-	-	-	-	-	-	-	70	3	30	16	41,601	-	-	-	-
300	30 350	300	141.	42,300		18	7,614 00	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous items of subdivision				-		-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	Miles: 30 Yrds. 350			1,336,618			339,441 46	11,480		562000.80			113,257 60	15,250		210,931		720,665 80					66,277	39	312		492,000

ADDITIONAL SUBDIVISION.

From the mouth of Savage River to Cumberland.

		AQUEDUCTS.					LOCKS.				CULVERTS			BRIDGES.			SUNDRIES.										TOTAL.
																	PUDDLING.			PAVING.			FENCING.			SUNDRIES.		
ce.	Amount.	Length in Yds.	No. of arches.	Span of arches.	Height of piers.	Amount.	No.	Lift in feet.	Price.	Amount.	No.	Price.	Amou n	No.	Price.	Amount.	Cubic Yds.	Price.	Amount.	Sq. Yds.	Price.	Amount.	Distance in miles.	Price.	Amount.		Amount.	Dollars. Cents.
k.	Dolls.			Feet.	Feet.	Dolls.			Dolls.	Dolls.		Dolls.	Dolls.		Dolls.	Dolls.		Cents.	Dolls.					Dolls.	Dolls.			
00	1.260 00	-	-	-	-	-	-	guard	1,500	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13,260 00
00	54.560 00	-	-	-	-	-	2	16	-	24,000	-	-	-	-	-	-	21,080	12	2,530	-	-	-	-	-	-	1 waste weir	200	92,747 60
40	5,896 80	-	-	-	-	-	2	16	-	24,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42,640 80
	-	-	-	-	-	-	2	16	-	24,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29,068 80
40	33.188 40	40	2	20	12	24,676	1	8	-	12,000	-	-	-	-	-	-	17,340	12	2,081	-	-	-	-	-	-	-	-	110,244 36
40	4,095 00	-	-	-	-	-	2	16	-	24,000	-	-	-	-	-	-	7,650	12	918	-	-	-	-	-	-	-	-	34,683 00
40	20,109 60	-	-	-	-	-	2	16	-	24,000	-	-	-	-	-	-	14,280	12	1,714	-	-	-	-	-	-	-	-	71,225 20
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,692 00
	-	-	-	-	-	-	2	16	-	24,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38,260 00
00	38,400 00	-	-	-	-	-	1	8	-	12,000	-	-	-	-	-	-	13,600	12	1,632	-	-	-	-	-	-	-	-	58,752 00
	-	-	-	-	-	-	5	40	-	60,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	93,477 76
	-	-	-	-	-	-	1	8	-	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19,833 60
00	81.200 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24,650	12	2,958	-	-	-	-	-	-	-	-	100,978 00
	-	-	-	-	-	-	1	8	-	12,000	-	-	-	-	-	-	17,000	12	1,940	-	-	-	-	-	-	-	-	29,564 00
00	33,280 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11,710	12	1,405	-	-	-	-	-	-	-	-	41,993 00
	-	-	-	-	-	-	2	16	-	24,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33,792 00
	-	-	-	-	-	-	2	16	-	24,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37,284 00
40	7,280 00	-	-	-	-	-	2	16	-	24,000	-	-	-	-	-	-	13,600	12	1,632	-	-	-	-	-	-	-	-	42,992 00
00	89,600 00	-	-	-	-	-	1	8	-	12,000	-	-	-	-	-	-	27,200	12	3,264	-	-	-	-	-	-	-	-	118,104 00
	-	-	-	-	-	-	3	24	-	36,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49,162 50
00	54,400 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14,450	12	1,734	-	-	-	-	-	-	-	-	65,994 00
	-	-	-	-	-	-	1	8	-	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,112 64
	-	-	-	-	-	-	1	8	-	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20,208 00
00	30,720 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,880	12	1,305	-	-	-	-	-	-	-	-	36,121 00
	-	-	-	-	-	-	4	32	-	48,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	85,854 00
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,732 80
00	62,916 00	-	-	-	-	-	1	8	-	12,000	-	-	-	-	-	-	24,990	12	2,999	-	-	-	-	-	-	-	-	84,971 00
00	3,840 00	-	-	-	-	-	-	guard	-	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	gate and waste weir	800	20,512 00
	-	-	-	-	-	-	1	8	-	12,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26,076 00
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,733 20
00	65,760 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17,680	12	2,121	-	-	-	-	-	-	-	-	79,945 00
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,710 00
00	39,680 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,540	12	1,265	-	-	-	-	-	-	-	-	48,137 00
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,281 00
00	66,880 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13,430	12	1,612	-	-	-	-	-	-	-	-	79,636 00
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12,945 60
00	27,600 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,900	12	612	-	-	-	-	-	-	-	-	37,833 00
	-	70	3	30	16	41,601	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44,193 00
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7,614 00
	-	-	-	-	-	-	-	-	-	-	34	300	10,200	3 / 9	500 / 300	4,200	-	-	-	-	-	-	18	900	16,200	-	-	30,600 00
	720,665 80					66,277	39	312		492,000			10,200			4,200			31,722						16,200		1000	1,794.903 86

3 1/2)

1844 = 22) 6000 (27.2 (8

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$\frac{1}{3}$

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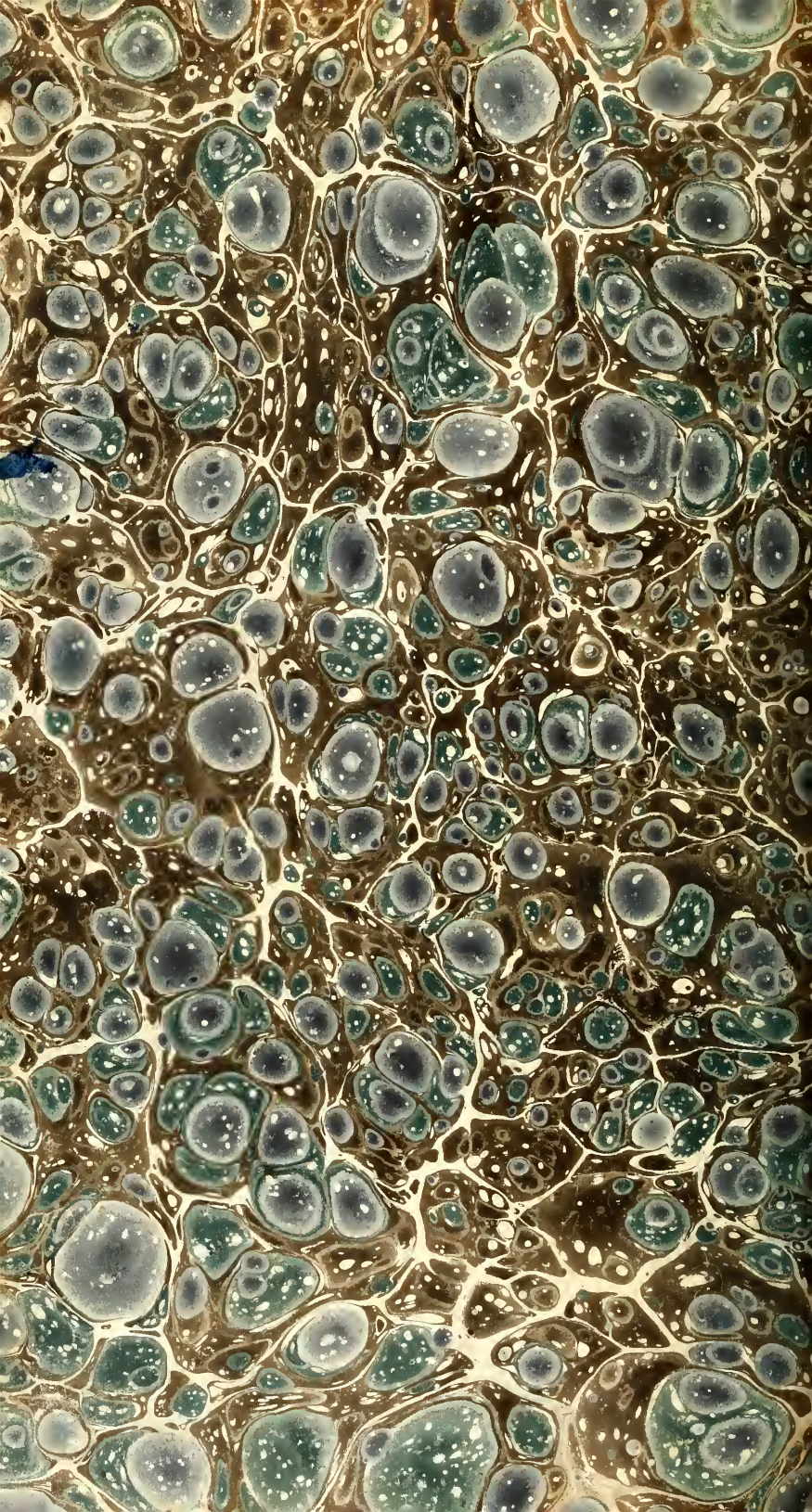
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